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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 :		(11) International Publication Number:
H04L	A2	WO 00/18054
		(43) International Publication Date: 30 March 2000 (30.03.00)

(21) International Application Number: PCT/US99/21900

(22) International Filing Date: 21 September 1999 (21.09.99)

(30) Priority Data:

60/101,416	22 September 1998 (22.09.98)	US
60/107,588	9 November 1998 (09.11.98)	US
60/113,142	18 December 1998 (18.12.98)	US
60/126,226	25 March 1999 (25.03.99)	US
60/132,066	30 April 1999 (30.04.99)	US

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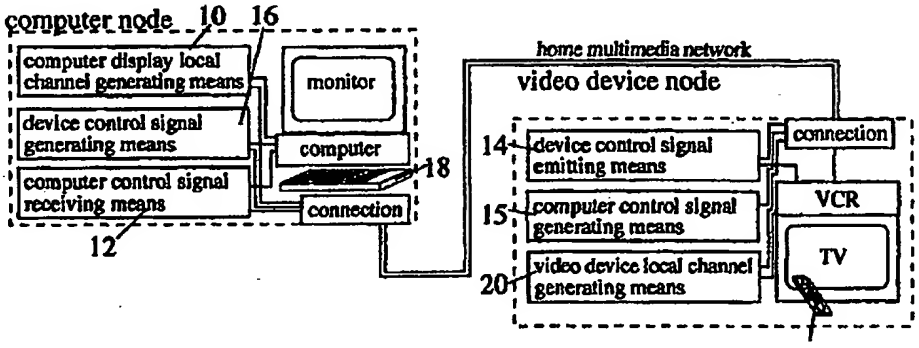
(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
Without international search report and to be republished upon receipt of that report.

(54) Title: METHODS AND APPARATUS FOR MULTIMEDIA NETWORKING SYSTEMS



(57) Abstract

A multimedia network for enabling the viewing of computer-generated data on any television, video and/or audio display connected to a multimedia network, such as a hard wired coaxial television cable network. The multimedia network enables the remote control of a computer via control signals carried over the multimedia network, as well as the remote control of a video device via control signals generated by a computer and carried over the multimedia network, thus enabling the viewing of computer-generated data on any television, video and/or audio display connected to a multimedia network. A method for indicating the content recorded on a video recording medium. The content may include recorded movies, television programs or home video recording. An HTML-type document is created by a computer or microprocessor and recorded on the recording medium. This HTML-type document includes information that pertains to the content recorded on the recording medium. An inventive wireless display terminal receives a video signal originating from a computer, multimedia or other audio and/or video signal generating device and transmitted via RF signals from an antenna node. A controllable, high security, low emission, clear and consistent wirelss signal zone anywhere desired within the office or home. Antenna node devices connect with pre-existing wire networks and act as a bridge between wireless devices and the hardwire network. The use of the pre-existing wire network creates an efficient and effective transmission path for connectivity between the antenna node devices and devices connected to the coax. The use of wireless network components creates the opportunity for mobility and avoids the problems associated with installing new wires.

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METHODS AND APPARATUS FOR MULTIMEDIA NETWORKING SYSTEMS

BACKGROUND OF THE INVENTION:

The present invention pertains to a multimedia networking system. The present invention also pertains to a wireless display terminal for use with a multimedia networking system. Further, the present invention pertains to antenna node devices for bridging a wired network and wireless devices of a multimedia networking system.

Multimedia networking systems allow the output of a audio, video or computer data signal generating device, such as a computer, VCR, DVD, home stereo, etc. to be available for display through a remotely located display device. For example, the monitor output of a computer located in one room in a home can be transferred via the networking system to a display device, such as a television, located in another room in the home. Control signals generated by a user input device, such as a remote controller or wireless keyboard, are transferred over the networking system to the computer so that a user can remotely control the computer while viewing the monitor output on the television.

Typically, the data signals are transmitted between the networked devices over a hard wire network, such as a coaxial cable, Ethernet, phone lines, or power lines. Alternatively, the data signals can be transmitted wirelessly using a radio frequency carrier wave.

However, in many home installations there is no one wired network available that can carry data from a source location (for example, a computer) to any room in the home. Wireless rf networking systems are less than adequate due to attenuation of the rf signal within the home because of, for example, the absorption and reflection of the rf signal when it encounters typical home building materials such as drywall, foil-backed insulation, concrete block, etc. Simply boosting the antenna power output from the point source of the signal (in this example, the location of the computer) to the receiving antenna (in this case, the mobile wireless display terminal wireless display terminal) is often not an effective solution. For such point-to-point transmission to be effective, the signal power may have to be boosted to a level that exceeds the maximum FCC (or other regulatory body) limitations. Also, the boosting of the antenna output may be undesirable in situations where the signal will interfere with other devices, or be susceptible to eavesdropping by neighbors, etc.

Accordingly, there is a need for a networking solution that combines the mobility and flexibility of a wireless network with the security and signal consistency of a hard wired network.

Further, there are many types of mobile computing devices, such as portable lap top computers, portable televisions, cordless phones, and the like. However, those devices are

not effective for simultaneously display computer-generated images, Internet content and full motion video.

SUMMARY OF THE INVENTION:

It is an object of the present invention to provide a multimedia network for enabling the viewing of computer-generated data on any television, video and/or audio display connected to a multimedia network, such as a hard wired coaxial television cable network. It is a further object of the present invention to provide a multimedia network for enabling the remote control of a computer via control signals carried over the multimedia network. It is a further object of the present invention to provide a multimedia network for enabling the remote control of a video device via control signals generated by a computer and carried over the multimedia network, and for enabling the viewing of computer-generated data on any television, video and/or audio display connected to a multimedia network. It is another object of the present invention to provide a method for indicating the content recorded on a video recorder. It is another object of the present invention to provide a video recording system for recording content-indicating information on a video recording medium. It is another object of the present invention to provide a wireless display terminal. The wireless display terminal receives a video signal originating from a computer, multimedia or other audio and/or video signal generating device and transmitted via RF signals from an antenna node. It is another object of the present invention to create a controllable, high security, low emission, clear and consistent wireless signal zone anywhere desired within the office or home. The present invention includes antenna node devices that connect with pre-existing wire networks and act as a bridge between wireless devices and the hardwire network. The use of the pre-existing wire network creates an efficient and effective transmission path for connectivity between the antenna node devices and devices connected to the coax. The use of wireless network components creates the opportunity for mobility and avoids the problems associated with installing new wires.

In accordance with the present invention, implemented through the inventive algorithms, methods and devices, and as described herein and shown in the drawings, a number of useful features are enabled throughout any home or office having the inventive multimedia system installed. These features include the following, and a variety of others described herein. Internet and email from any television. Run computer applications from any television. Play computer CD-ROM games at any television. Play a DVD-ROM movie from your computer and watch it on any TV in the house. View the output of any video device (satellite, cable box, VCR or video recorder, DVD, WebTV) on any TV. Use a VCR in one room to make a copy of a tape from a VCR or video recorder in another room. Control any computer, video or audio device from any room in the house. Video intercom between any of the TVs in the house. Speaker phone with advanced caller id, message mailbox and address list from

any television. Advanced VCR or video recorder content-indicating recording and control. Multiple screen picture-in-a-picture on any TV. Point and click VCR or video recorder programming. Automatic profile-based television show selection and VCR programming. Wireless sound activated video baby monitor or security camera viewable on any TV. In-house digital data transfer between computers, printers and other peripherals. Home automation with voice activation as well as feedback and control displays on any TV. Compatible with most or all conventional analog televisions, computer monitors and HDTV. Compatible with most or all cable and satellite set top boxes, Internet appliances, VCRs, DVDs. Compatible with home automation systems such as X-10.

The inventive system also comprises a number of embodiments of a wireless display terminal. The wireless display terminal receives a video signal originating from a centralized computer and transmitted via RF signals from an antenna node. The antenna node may be located in the proximity of the centralized computer, or may be connected to the centralized computer through a wire network, such as a phone line, co-axial cable, electrical power line, fiber optic, data line, or other wire network. The wireless display terminal may also receive signals from a video and/or audio signal source, such as a video recorder, set top box, telephone system, video camera, intercom, security system, home automation system, or other video and/or audio signal generator. The video and/or audio signals are again transmitted via RF signals from the antenna node located in proximity with the video and/or audio signal source or connected to the source through the wire network.

The inventive wireless display terminal may include video and/or audio signal generating and transmitting components, such as a CCD camera, microphone and RF signal transmitter. The wireless display terminal may thus be used for two-way audio and/or video communication with various display devices connected to the inventive network, and through the network connection, with various external devices and systems. For example, the wireless display terminal can be used as a remote video and audio link for external communication through a telephone or video conferencing system, and through the Internet or other network system. The wireless display terminal may also be used for a video and/or audio intercom system with other devices connected locally to the inventive multimedia network.

The wireless display terminal can be used as a highly portable personal digital assistant. When within the range of its "home" multimedia network, the wireless display terminal acts as a mobile computer monitor and television or video recorder display. Through the remote control of the centralized computer, the wireless display terminal effectively has the computational power of the centralized computer. The inventive wireless display terminal may include on-board intelligence, such as a CPU or
e.g. microprocessor, to enable it to function as a PDA even when outside the range of the

inventive multimedia network. Further, the wireless display terminal can also be used with other wireless networks other than its "home" network.

The wireless display terminal can also have sufficient on-board storage to enable it to download HTML and other documents from network connections such as the Internet. The Internet connection can be direct via an on-board modem, or it can indirect through data transferred from the centralized computer.

The inventive wireless display terminal can include a control signal generator for generating control signals that are effective to remotely control the operation of the centralized computer. The control signal generator can also directly control the various appliances and devices in the home through the emission of infrared or other wireless signals, or these appliance and devices can be indirectly controlled via the control of the centralized computer.

The inventive system includes modular units (starting from a basic configuration that can be built upon to add functionality) that are easy to install into the pre-existing home coaxial cable television network, telephone or electrical wiring, can be included in the wiring of a new construction, installed as a wireless system, or include a combination of different hard wire and/or wireless nodes. In its basic form, the system lets any TV in the house act as a computer monitor, and allows the computer to control the video devices distributed through out the house, such as TVs, VCRs and cable set top boxes, and audio devices such as stereos, CD players, etc. The computer control of the devices, such as TVs, VCRs, etc., combined with the availability of the computer and device output on any television enable a host of useful and novel features, distributing virtual computer intelligence throughout the relatively "dumb" pre-existing home stereo and video devices. The video and/or audio output of any video device, audio device or computer on this multimedia network can be made available on any device on the network that is capable of using the output.

With the installation of the basic configuration, any room in the home that has a coaxial cable hook-up becomes a network node. For those locations that do not have a coaxial cable hook-up, a wireless node can be provided. In the preferred configuration, each node includes an addressable interface unit that has some limited built-in intelligence. A centralized conventional home desktop computer does the bulk of the processing power. For those homes without a computer, a dedicated microprocessor can be provided that allows for the operation of most of the inventive system features.

The inventive system is designed from the ground-up to be extremely simple to install and initialize, with automatic upgrade potential and system diagnosis that maintains trouble free operation. The inventive system is compatible with most any cable, satellite or broadcast television connection.

With the basic configuration installed, any TV in the home will have access to the Internet, email, computer gaming and any other typically used computer function (record keeping, word processing, scheduling, etc.).

Other features include a video intercom system that allows for two-way video and audio communication between users located at different rooms in the home. A speaker phone system with advanced caller id and voice activation, as well as an Internet-based video telephone system that allows two-way video and audio communication between users at different locations anywhere in the world (from the comfort of their respective living room couch). A sound and/or motion activated wireless video monitor automatically turns on any selected television(s) and alerts when the baby cries or when someone is at the door. A home stereo distribution system allows a home stereo located in any room in the house to be controlled and listened to (using the television speakers, if available) from any other room in the house.

The inventive system includes an advanced VCR control system that provides content-indicating recording and detection for recording and displaying content-indicating information to and from a videotape. A VCR located anywhere in the home is controlled to record a computer-generated information header at the beginning of the videotape. The recorded signal is a WWW-like content page that can be displayed on any television via the computer-network connection, with hyperlinks that correspond to the television programs recorded on the videotape. Alternatively, each videotape can have a tape identification signal recorded continuously recorded on it. The tape identification signal corresponds to a tape database stored in the computer hard drive or other storage device 24. In addition to the tape identification, the header or other locations on the tape and the tape database contain information such as what is recorded on the tape, the location of commercial breaks, amount of time left for recording on the tape, amount of time of content recorded on the tape, tape location marks, the locations of the beginning and ending of programs recorded on the tape, hyperlinks and web-like html pages (which may correspond to the content recorded on the tape, or be provided for other purposes, such as advertisements and program and movie previews), still photos, and other data. In the case of the hyperlinks and web-like pages, multiple pages may by downloaded from the videotape to the computer to be cached. The data can be provided in the vertical-blanking interval and/or at any other recordable portion of the videotape (such as just prior to the start of the program). Further, a short segment of each program recorded on the tape can be provided at or near the beginning of the tape, and its location identified either by data recorded on the tape and/or in the database, so that the viewer can get a glimpse of what each program is about.

As an example of the inventive system's advanced VCR features, when a videotape is inserted in any of the home's VCRs, a content page can ~~uploaded~~ BE from the VCR to the computer for display on a TV located anywhere in the house (NOT

necessarily in the room where the VCR or the computer is located). The playback of the tape can be controlled via signals generated in accordance with software running on the remotely located computer. The content page includes links to the Internet for information relevant to the recorded show, suggestions of similar shows, etc. By activating one of the content page's hyperlinks, the user selects a recorded TV show to watch. The computer receives the selection and controls the VCR to cue up the selected recorded TV show and begin playback. Using a determined user-profile (determined by a questionnaire and/or by a data base of the TV viewing habits of the household), the computer can be used to predict what shows the user might be interested in, access the Internet or electronic programming guide, and automatically control the VCR to record these shows anytime during the day or evening without any additional user input.

In accordance with an embodiment of the inventive multimedia network, a first computer node is provided including computer display local channel generating means for generating a computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a computer locatable at the computer node. The computer display local television channel being effective for allowing displaying of video data generated by the computer on an ordinary television located on the multimedia network remotely from the computer. Device control signal generating means controllable by the computer generates device control signals transferable over the multimedia network. The device control signals are effective to selectively control at least one video device located on the multimedia network remotely from the computer. Computer control signal receiving means receives computer control signals transferred over the multimedia network. Content determining means determines content-indicating information corresponding to the content recorded on or to be recorded on videotape. Cue determining means determines control cue information for automatically controlling a videotape recorder. Converting means converts the determined content-indicating information into recordable content data. Generating means generates a recordable information signal for recording on the videotape. The generating means includes content signal generating means for generating a recordable content signal corresponding to the recordable content data, cue signal generating means for generating a recordable control cue signal corresponding to the control cue information and combining means for combining the recordable content signal with the recordable cue signal to generate the recordable information signal. Transferring means transfers the recordable information signal to a videotape recorder, and video device controlling means controls the videotape recorder to record the recordable information.

The video device controlling means includes playback controlling means for controlling the video recorder to playback a recorded information signal including the recordable content signal previously recorded on the videotape. Detecting means

detects the content-indicating information from the recordable information signal so that an indication of the recorded content of the videotape can be displayed. The transferring means includes means for transferring the recordable information signal to an information signal detecting means.

A video device node is included on the multimedia network. Video device local channel generating means generates a video device local television channel containing the video and/or audio output of the video recorder or other multimedia device located at the video device node. In accordance with the inventive VCR tape content indicating aspects of the present invention, the recorded information signal played back from the videotape is included in the video and audio output of the video recorder. Device control signal emitting means receives the device control signals and emits video device control signals effective for controlling the video recorder located on the multimedia network remotely from the computer. Thus, the video device can be remotely controlled by the computer. The video device node further includes computer control signal generating means controllable by a user input device for generating computer control signals transferable over the multimedia network so that the computer can be remotely controlled in response to a user input.

The detecting means includes means for detecting control cue information from the recordable information signal. The device control signal emitting means emits device control signals for automatically controlling the videotape recorder depending on the control cue information.

The video device local channel generating means includes means for generating the video device local television channel as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless IR signals; and the computer control signal generating means includes means for generating the computer control signals as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless IR signals. In accordance with one embodiment, the video device local channel generating means includes means for generating the video device local television channel as rf signals carryable over a pre-existing home coaxial cable television network, and the computer control signal generating means includes means for generating the computer control signals as dc signals carryable over the pre-existing home coaxial cable television network.

In order to avoid any conflicts with televisions channels available from a cable television provider (or other television service provider), the rf signals can be modulated by carrier frequencies that are outside the range allotted to television channels, or outside the range of frequencies that are tunable by an ordinary television. In this case, the frequencies that are used to generated the local television channels can be preset, making the implementing circuitry less complicated as compared with the

system that must first determine which channels are available, find a suitable channel that does not have too much interference from an adjacent channel, filter out the suitable channel, and then use a variable frequency generator to generate the suitable channel for use as a carrier frequency for the local channel. Rather, in accordance with this aspect of the present invention, a predetermined set of frequencies can be generated by preset frequency generator(s), and their association as a local channel generator for a device manually set by the user.

The computer display local channel generating means may include high-definition signal generating means for generating the local television channel as containing the video output signal as high-definition-display-device-driving information for driving a high definition display such as a computer monitor or high definition television. The inventive multimedia network may include a high-definition node having display-driving means for receiving the local television channel containing the high-definition-display-device-driving information and for driving a high definition display device.

The first computer node includes computer data signal generating means for generating a computer data signal in accordance with computer data received from the computer for transfer of the computer data signal over the multimedia network. The inventive multimedia network may include a computer device node having computer data signal receiving means for receiving the computer data signal from the multimedia network for transfer to a second computer or computer data using device such as a printer or data storage device 24 locatable at the second computer node.

The computer data signal generating means includes means for generating the computer data signal as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless IR signals.

A second computer node may be provided on the inventive multimedia network. The second computer node has another computer display local channel generating means for generating another computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a second computer. Another computer control signal receiving means receives the computer control signals transferred over the multimedia network.

Further, the multitasking and multiple monitor display capabilities enabled by conventional desktop computer operating systems are taken advantage of in accordance with the present invention. Multiple users of the same computer can be accommodated simultaneously by generating a plurality of local television channels that each correspond with a respective computer monitor output signal. The familiar desktop elements such as task bars, menus and available files and storage devices can be replicated for each user by generating windows having the appropriate user interface

elements. Further, the preferences of each user can be maintained in a user database so that a particular desktop and available features are displayed through a customizable graphical user interface.

In accordance with the present invention, addressable controlling means may be provided including an address signal generator for generating an address signal and address signal receiver for receiving the address signal. The address signal generator being controllable by the computer, controlled through manual input or managed by a stand-alone microprocessor. The address signal receiver is effective for controlling the device control signal emitting means to emit the device control signal depending on the received address signal. Thus, the devices on the inventive multimedia network can be selectively controlled depending on the address signal associated with the particular device or node. The address signal generating includes means for generating the address signal as a signal carryable over a pre-existing home coaxial cable television network and connecting means for connecting the address signal generator to the pre-existing home coaxial cable television network. A selectable channel filtering means selectably filters channel frequencies carried on a television signal source in communication with the multimedia network, the selectably filtered channel frequencies are thus made available for use as local television channels.

In accordance with the present invention, the inventive multimedia network can be used to provide enhanced uses of the pre-existing video, audio and multimedia device in a home. For example, each room of the home that has a television can become part of an in-home speaker phone, video phone or video intercom system. In accordance with this aspect of the invention, at least one microphone input located at a location on the multimedia network is provided for receiving microphone signals. Selecting means, such as a relay circuit, selects the input of the microphone signals and adding means adds the selected input of the microphone signals to be carried on the multimedia network. Means, such as a connection with the speakers of a pre-existing TV or stereo system generates audible sound signals corresponding to the selected input of the microphone signals at a location on the multimedia network remote from the location of the at least one microphone input receiving the selected input of the microphone signals. At least one video camera input is located at a location on the multimedia network for receiving video camera signals. Selecting means selects the input of the video camera signals, and at least one of the computer display local television channel generating means and the video device local television channel generating means includes means for including the selected input of the microphone signals and the selected input of the video camera signals in the corresponding computer display local television channel and the video device local television channel.

In the case of a home speaker-phone system, means is provided for connecting the selected input of the microphone signals to a telephone system. means for notifying

the existence of a received telephone call on at least one display connected to the multimedia system and means for answering the received telephone call and selecting the input of the microphone signals received by the microphone input are also provided. These can all be done through the telephony circuitry and appropriate software control of available personal computer system, or a stand-alone microprocessor or telephony circuitry can be employed. Means may be included for determining a telephone number of a received telephone call. In this case, the caller-id data carried with a conventional telephone call signal is accessed and the origin phone number is determined. Means is provided for displaying the determined telephone number on said at least one display. The determined phone number may be displayed as an over-lay graphic that is generated and combined with the video signal (such as a TV program) that is being displayed.

In accordance with the addressable capabilities of the present invention, it can be determined in what room the user is that is taking the phone call by detecting the address signal generated along with the computer or device control signals when the user selects to take the call. Thus, the microphone and or video camera only at that location is activated to carry the phone, video phone or video intercom conversation.

Means may be provided for connecting to the Internet and downloading Internet data, along the lines of the commercially available WebTV Internet appliance, cable or teleco modems, etc. Internet video output signal generating means receives the Internet data and generates an Internet video signal dependent thereon. The device local channel generating means includes means for generating the video device local television signal containing the Internet video output signal data.

The computer can be connected to the Internet via means for connecting the computer to the Internet and downloading Internet data (such as a conventional modem). The computer display local channel generating means includes means for generating the computer display local television signal containing the Internet video output signal data.

Device control signals can be transferred over the multimedia network between the location of the user and the Internet connected device to allow for navigation of the Internet content. Thus, a single Internet accessing device can be used to provide Internet access on any display device on the inventive multimedia network.

BRIEF DESCRIPTION OF THE DRAWINGS:

Figure 1 is a block diagram showing the basic configuration of the inventive multimedia network;

Figure 2(a) is a block diagram showing a computer-enabled VCR system in accordance with the present invention;

Figure 2(b) is a block diagram showing the inventive VCR/Internet appliance;

Figure 2(c) is a block diagram showing a configuration of an inventive multiple node wireless multimedia network;

Figure 2(d) is a block diagram showing a DVD recorder system controlled over the inventive multimedia network in accordance with the present invention;

Figure 2(e) is a block diagram showing a computer-enabled DVD or random access recorder system in accordance with the present invention;

Figure 2(f) is a block diagram showing a DVD/RAM/Internet appliance;

Figure 2(g) illustrates a variety of random access memory configurations for a random access video recorder in accordance with the present invention;

Figure 3(a) is a block diagram of the inventive video recording system for recording content-indicating information on a videotape;

Figure 3(b) is a block diagram of the inventive multimedia network including the inventive video recording system for recording content-indicating information on a videotape;

Figure 3(c) is a block diagram of the inventive multimedia network including the inventive video recording system, in-house video intercom, multiple computer device nodes and other inventive features and enhancements;

Figure 3(d) is a block diagram illustrating the connecting through a communications network such as the Internet or telephone lines connection to another multimedia network of the inventive multimedia network shown in Figure 3(c), and showing a video telephone conversation between a user located at the multimedia network shown in Figure 3(c) with another user located at the other multimedia network;

Figure 3(e) is a block diagram showing a mixed network system for connecting various node of the inventive multimedia network, including a connection between a computer node and a first device node via data transferred through a home electrical wiring network and a connection between the second device node and the first device node via a home co-axial cable connection;

Figure 3(f) is an illustration showing a wireless audio transmission system for effecting the control of a VCR and a remotely located computer in response to audio tone and speech recognition signals transmitted via a wireless audio transmitting user remote controller;

Figure 3(g) is a table showing the mapping of the remote control buttons to frequency or pulse train signals corresponding to software-determined variable functions for controlling various appliances and devices using a single remote control unit.

Figure 3(h) is a block diagram showing the components of the set top box shown atop the VCR in Figure 3(e) and the remote control unit;

Figure 3(i) is a block diagram of an embodiment of the inventive multimedia network having a computer node with multiple TV channel tuning capabilities, and a manual user selectable local channel frequency selection means for assigning the local channels containing the computer video output and the device video output in a manually defined manner;

Figure 3(j) is a flow chart showing the initialization of the inventive multimedia network system;

Figure 3(k) is a block diagram showing an embodiment of the inventive multimedia network configured for allowing multiple simultaneous users of a single computer with separate computer generated video information displayed on three remotely located televisions or other display devices connected to the inventive multimedia network;

Figure 3(l) is a flow chart for enabling multiple simultaneous users of a single computer with separate computer generated video information displayed on three remotely located televisions or other display devices connected to the inventive multimedia network;

Figure 3(m) is a block diagram of the inventive multimedia network having a device remote control signal detector and a device status detector for enabling the computer to determine the status of a device, such as its on/off state, and the operation of the device, such as remote controlled channel selection, for a device connected with the inventive multimedia network;

Figure 3(n) is a block diagram of an embodiment of the inventive multimedia network utilizing local television channels that are outside the frequency range of normally received television channels;

Figure 3(o) is a block diagram showing a configuration of the inventive multimedia network for directing data to and for controlling devices capable of recording one type of data to record data not normally recorded by the device;

Figure 3(p) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wirelessly linked computer; the wireless linked computer being enabled for use with the inventive multimedia network via wireless components incorporated in a standard PCI or expansion module;

Figure 3(q) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wireless display terminal, the wireless display terminal being enabled with a wireless transmitter and receiver for use with the inventive multimedia network and for use with other similarly configured wireless display terminals;

Figure 3(r) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wireless display

terminal, the wireless display terminal being capable of sending video and audio back to the multimedia network and to other similarly configured wireless display terminals;

Figure 3(s) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wireless display; the wireless display terminal being comprised of relatively low cost components;

Figure 3(t) illustrates a configuration of an embodiment of a touch screen wireless remote control device for displaying a same image on the remote control device screen as is shown on a large display connected with the inventive multimedia network;

Figure 4(a) is a flowchart showing the basic method for recording content-indicating information on a VCR tape in accordance with the present invention;

Figure 4(b) is a flowchart showing the basic method for playing back content-indicating information recorded on a VCR tape in accordance with the present invention;

Figure 4(c) is a flowchart showing the basic method for recording content-indicating information on a DVD or other random access recorder in accordance with the present invention;

Figure 4(d) is a flowchart showing the basic method for playing back content-indicating information recorded on a DVD or other random access recorder in accordance with the present invention;

Figure 4(e) illustrates a random access disk recording media having program content, a program content indicating document, and program content and document address index signal recorded thereon in accordance with the present invention;

Figure 4(f) is a flow chart showing the steps for controlling remote devices using the inventive wireless terminal via a remote computer in accordance with the present invention;

Figure 4(g) is a flow chart showing the steps for choosing the display selection for the inventive wireless terminal;

Figure 5 is a block diagram illustrating a configuration of the inventive multimedia network configured as stand-alone accessory boxed distributed on network through direct and wireless connections;

Figure 6 is a block diagram showing the use of microphone and speaker ports of a computer or video device for transferring signals for recording and receiving VCR tape content information over the inventive multimedia network;

Figure 7 is a block diagram showing the inventive multimedia network configured as an add-on part for a computer and imbedded VCR system;

Figure 8 is a block diagram showing the inventive multimedia network distributed over an existing home phone line network for transferring video, audio and/or computer data as a digital and/or analog signal;

Figure 9 is a block diagram showing the inventive multimedia network distributed over an existing home coaxial cable television network for transferring video, audio and/or computer data as a digital and/or analog signal;

Figure 10 is a block diagram showing the inventive multimedia network distributed over the existing home electrical wiring network for transferring video, audio and/or computer data as a digital and/or analog signal;

Figure 11 is a block diagram illustrating the capabilities of a single computer-enabled set top box being available at any TV on the inventive multimedia network;

Figure 12 shows the details of a distributed computer-enabled set top box capabilities distributed over the inventive multimedia network;

Figure 13 is a block diagram showing a basic configuration of an inventive addressable multimedia network;

Figure 14(a) is a schematic representation of a VCR tape recorded in accordance with the inventive method for indicating the content recorded on a videotape;

Figure 14(b) is a schematic representation of a VCR tape recorded with short portions of the different television programs or home video recording segments recorded at the beginning of the tape for facilitating recorded content selection;

Figure 14(c) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the tape having room for piggyback data;

Figure 14(d) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording inaudible tone signals used as recorded control cue information recorded throughout the tape or at specific locations in accordance with the present invention;

Figure 14(e) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording tape identifying information and location on tape identifying information throughout the tape or at specific locations in accordance with the present invention;

Figure 14(f) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording tape identifying information and/or location on tape identifying information and/or commercial skip data throughout the tape and/or at specific locations in accordance with the present invention;

Figure 15 is a schematic representation of the VCR tape shown in Figure 14(a);

Figure 16 is a schematic representation of the VCR tape shown in Figure 14(a);

Figure 17 is a flow chart showing a tape formatting operation in accordance with the inventive method for indicating the content recorded on a videotape;

Figure 18 is a flow chart of a pre-recording procedure in accordance with the inventive method for indicating the content recorded on a videotape;

Figure 19 is a flow chart of the tape recording procedure in accordance with the inventive method for indicating the content recorded on a videotape;

Figure 20 is a flow chart showing the playback procedure of a selected pre-recorded program in accordance with the inventive method of indicating the content recorded on a videotape;

Figure 21 is a block diagram showing an example configuration of the inventive multimedia network containing multi-purpose nodes distributed over a pre-existing coaxial cable television network;

Figure 22 is a continuation of the example multimedia network shown in Figure 21;

Figure 23 is a continuation of the example multimedia network shown in Figure 21;

Figure 24 is a continuation of the example multimedia network shown in Figure 21;

Figure 25 is a perspective view of a wireless multimedia computer for use with the wireless distribution node of the inventive multimedia network shown in Figure 24;

Figure 26 is a schematic side view showing parts of the wireless computer shown in Figure 24;

Figure 27(a) is a front view of a wireless display terminal or use with the wireless distribution node of the inventive multimedia network shown in Figure 24;

Figure 27(b) is a perspective view of a wireless display terminal or use with the wireless distribution node of the inventive multimedia network shown in Figure 24;

Figure 28(a) is an isolated view of a touch screen user input device and LCD display screen, with a block diagram showing the components of an embodiment of the inventive wireless display terminal;

Figure 28(b) is a front view of an embodiment of the inventive wireless display terminal having an attachable touch screen/display unit that can be attached to a self-contained wireless computer as shown in Figure 26, with a wireless component unit attached to the touch screen/display unit;

Figure 28(c) is a front view of the wireless display terminal shown in Figure 28(b) having the wireless component unit being detached;

Figure 28(d) shows an embodiment of the inventive wireless display terminal mounted on a keyboard stand;

Figure 28(e) shows the wireless display terminal being detached from the keyboard stand;

Figure 28(f) shows the wireless display terminal having the keyboard stand being placed in a stowed position;

Figure 28(g) shows the wireless display terminal having the keyboard stand disposed in the stowed position behind the display screen;

Figure 28(h) shows the wireless display terminal having the keyboard stand disposed in a protective position in front of the display screen;

Figure 28(i) shows a wireless display terminal having an internally disposed directional antenna for use in communicating with the remote computer, devices connected with the multimedia network, wireless modem, and/or radio telephone;

Figure 28(j) is a side view showing the wireless display terminal shown in Figure 28(i) and showing an internally disposed directional antenna, communication circuit and display screen;

Figure 28(k) is a perspective view of an inventive personal digital assistant having the inventive antenna assembly mounted for wireless communication; and

Figure 28(l) is a side view of the personal digital assistant shown in Figure 28(k), schematically showing a communication circuit, display screen and the inventive antenna assembly;

Figure 28(m) is an isolated enlarged cross sectional view of a flexible rechargeable battery used in accordance with the present invention;

Figure 28(n) is an isolated schematic view of a wireless terminal circuit board disposed adjacent to the flexible rechargeable battery;

Figure 28(o) is a cross sectional top view of a flexible rechargeable battery and wireless terminal case shell prior to assembly in accordance with a manufacturing aspect of the present invention;

Figure 28(p) is a cross section top view of the assembled flexible rechargeable battery and wireless terminal case shown in Figure 28(o);

Figure 28(q) is a cross sectional side view taken along line c-c of the assembled flexible rechargeable battery and wireless terminal case shown in Figure 28(p);

Figure 28(r) is an isolated enlarged cross sectional side view of an assembled and electrically sealed end of the wireless terminal case shown in Figure 28(q);

Figure 28(s) is an enlarged cross sectional view of an antenna assembly in accordance with the present invention;

Figure 28(t) is a cross sectional view along line 40-40 of Figure 28(s);

Figure 28(u) illustrates an inventive wireless display terminal having computer controlled display-changeable button function names mapped to side buttons;

Figure 29 is a schematic perspective view of a bracelet personal locator for use with the wireless distribution node of the inventive multimedia network shown in Figure 24;

Figure 30(a) is a schematic perspective view of a badge-type personal locator for use with the inventive multimedia network shown in Figure 24;

Figure 30(b) illustrates an adhesive patch body circuit having a signal transmitter for use as a personal locator;

Figure 30(c) illustrates the adhesive patch body circuit adhered to the arm of a user;

Figure 30(d) illustrates an implantable body circuit having a signal transmitter implanted within the arm of a user;

Figure 31 is a perspective view of a hand-held personal digital assistant for use with the wireless distribution node of the inventive multimedia network in Figure 24;

Figure 32 is a graphic illustration of an addressable unit pulse train and device control signal pulse train;

Figure 33 is a block diagram showing a configuration of an addressable multimedia network having a single local channel generator at each node;

Figure 34 is a block diagram showing a configuration of the inventive addressable multimedia network having multiple computer nodes and video device nodes distributed on the network;

Figure 35 is a block diagram showing another configuration of the inventive addressable multimedia network having a node with a double local channel generator;

Figure 36 is a block diagram showing another configuration of the inventive addressable multimedia network having a three channel high-definition location channel generator;

Figure 37 is a block diagram showing another configuration of the inventive addressable multimedia network having a computer node and a computer signal device node;

Figure 38 is a block diagram showing a example prototype configuration of the inventive multimedia network;

Figure 39 shows some of the windows of the Multimedia Network prototype FaceSpan project;

Figure 40 shows some more of the windows of the Multimedia Network prototype FaceSpan project;

Figure 41(a) is a schematic diagram of an IR remote control signal playback circuit module and an IR remote control signal capture circuit module for connecting with a computer (or other remote control signal generator/detector) and the inventive multimedia network to enable the computer to capture and learn the remote control signals remotely generated by an IR generating remote control unit at a device node or at

the computer node, and to allow the computer to generate device control signals for controlling devices located remotely on the inventive multimedia network;

Figure 41(b) is a schematic diagram of an IR remote control signal playback circuit module and an IR remote control signal capture circuit module for connecting with a computer (or other remote control signal generator/detector) and the inventive multimedia network to enable the computer to capture and learn the remote control signals remotely generated by an IR generating remote control unit at a device node, and to allow the computer to generate device control signals for controlling devices located remotely on the inventive multimedia network;

Figure 41(c) is a schematic diagram of an IR detector and emitter unit for use at a device node to be connected via the multimedia network with the IR circuit modules shown in Figures 41(a) and (b) located at a computer node or other remote control signal generating node;

Figure 41(d) is a flowchart showing the steps for using the IR remote control detector shown in Figure 41(b) for learning the remote control signals for devices connected to the multimedia network;

Figure 42(a) shows a display device screen, such as a television, receiving video data generated by the remotely located computer indicating the initialization of a video intercom call;

Figure 42(b) shows a display device screen, such as a television, receiving video data generated by the remotely located computer showing a video intercom call in process;

Figure 42(c) shows a display device screen, such as a television, receiving video data generated by the remotely located computer showing the zooming in of the caller's image during a video intercom call;

Figure 43 is a flowchart showing the operation of a video intercom conversation in accordance with the present invention;

Figure 44(a) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a horizontal split screen with an internet web page and a television program;

Figure 44(b) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a picture-in-a-picture (PIP) split screen with an internet web page and a television program;

Figure 44(c) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a vertical split screen with an internet web page and a television program;

Figure 45(a) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a PIP split screen with a first

television program shown full screen and a second television program shown in PIP format;

Figure 45(b) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a PIP split screen with a first television program shown with it screen size altered to fit within one-half the display area and a second and a third television program shown in PIP format;

Figure 45(c) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a horizontal split screen with a first television program resized to fit within the top half the display area and a second television program resized to fit within the bottom half the display area;

Figure 46 is a flowchart showing the operation of a computer controlled via software to enable a remotely located device to record a radio program with a content-indicating information signal;

Figure 47 is a flowchart showing the operation of a computer controlled via software to enable a remotely located VCR to obtain a commercial skip VCR recording feature in accordance with the present invention;

Figure 48 is a flowchart showing the operation of a computer controlled via software to enable a remotely located VCR to obtain another version of the commercial skip VCR recording feature in accordance with the present invention;

Figure 49 is a flowchart showing the operation of a computer controlled via software to enable a remotely located VCR to playback a recorded program with the commercial skip feature in accordance with the present invention;

Figure 50 is a flowchart showing the operation of a computer controlled via software to enable TV viewing autopilot features in accordance with the present invention;

Figure 51 is a flowchart showing the operation of a computer controlled via software to enable a commercial rebound feature in accordance with the present invention;

Figure 52 is a flowchart showing the operation of a computer controlled via software to enable parental control features in accordance with the present invention;

Figure 53 is a flowchart showing the operation of a computer controlled via software to enable additional parental control features in accordance with the present invention;

Figure 54 is a flowchart showing the operation of a computer controlled via software to enable a voice-activated child monitor feature in accordance with the present invention;

Figure 55 is a flowchart showing the operation of a computer controlled via software to enable a security alert feature in accordance with the present invention;

Figure 56 is a flowchart showing the operation of a computer controlled via software to enable scheduling features in accordance with the present invention;

Figure 57 is a flowchart showing the operation of a computer controlled via software to enable a home reference system feature in accordance with the present invention;

Figure 58 is a flowchart showing the operation of a computer controlled via software to enable an Internet-based alert feature in accordance with the present invention;

Figure 59 is a flowchart showing the operation of a computer controlled via software to enable an email alert feature in accordance with the present invention;

Figure 60(a) is a flowchart showing the duplication of a video by remotely controlling two or more devices connected with the inventive multimedia network;

Figure 60(b) shows a configuration of a set top box for use with the inventive multimedia network;

Figure 60(c) shows an inventive wireless display terminal for use within range of a multimedia network identified on the network via addressable handshake exchange, and for use outside the range of the network for use as a stand-alone personal digital assistant, pager, cellular telephone, etc.;

Figure 60(d) shows an inventive wireless display terminal in use for controlling devices connected with the multimedia network through control signals communicated via a central computer;

Figure 60(e) shows an inventive wireless display terminal connected with a central computer of an inventive multimedia network having multiple computer display local channels;

Figure 60(f) shows a variety of wireless display terminals connected and communicating with each other through control signals via a central computer;

Figure 60(g) shows a plurality of wireless display terminals in use in a class room setting;

Figure 60(h) shows a wireless display terminal connected with a multimedia network having the capability of displaying TV (NTSC) and high-definition (computer monitor, HDTV) display images;

Figure 60(i) illustrates a home multimedia network that connects with display, input and control devices throughout the home, and that communicates with a computer system located in a vehicle node when the vehicle is in the home garage;

Figure 60(j) illustrates a home multimedia network having content input received through Internet, satellite, cable television, phone line and the like at a central computer and distributed via bridge circuits throughout the home via coaxial cable, phone line and electrical wiring networks

Figure 61 illustrates a child's toy having sensors and input mechanisms used for communicating with a remote computer via a wireless transmission and reception circuitry and display output and toy movement controlled in response to control signals originating from the computer;

Figure 62(a) is a block diagram showing a bridge circuit for use with the inventive multimedia network for enabling simultaneous two-way audio, video, data and control signals generated by various devices connected to the network to transmit over hard wire networks such as coaxial, phone, electrical and data line as well as for the wireless transmission of such signals;

Figure 62(b) shows an expansion module for use with a pre-existing notebook or desktop computer to enable simultaneous two-way way audio, video, data and control signals generated by various devices connected to the network with the pre-existing computer;

Figure 62(c) shows a prototype configuration demonstrating the feasibility of the inventive bridge circuit and expansion module shown in Figures 62(a) and 62(b);

Figure 62(d) shows an alternative embodiment of the inventive expansion module including a removable video/audio/control signal transmitter;

Figure 63(a) illustrates an inventive home or office network configuration, comprising a home or office network module connected to at least one I/O port and a monitor port of a computer a second network module connected at a multimedia device (VCR);

Figure 63(b) is a block diagram illustrating a configuration of a multimedia device transceiver network module and a computer transceiver network module;

Figure 63(c) illustrates an inventive home or office network configuration having a wireless network communication with a wireless display terminal wireless display terminal via at least one antenna node device directional antenna coax faceplate;

Figure 63(d) is a block diagram illustrating a configuration of the home or office network with a wireless signal communication between the wireless display terminal and the computer transceiver network module via the directional antenna coax faceplate;

Figure 63(e) illustrates the use of the inventive antenna node device directional antenna coax faceplate for creating a clear consistent wireless signal within a networked home or office;

Figure 64(a) is a front view of an embodiment of the inventive antenna node device directional antenna coax faceplate;

Figure 64(b) is a perspective view of the embodiment of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a);

Figure 64(c) is an isolated perspective view of a directional antenna and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a);

Figure 64(d) is an isolated side view of a directional antenna and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a);

Figure 65(a) is an isolated side view of the directional and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a) connected to a coax network;

Figure 65(b) is block diagram of an embodiment of the directional and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 65(a);

Figure 65(c) illustrates a home or office networked home having antenna node devices connected at various terminal ends of a pre-existing coax network, and further illustrating the inventive capabilities of wireless signal attenuation within the zone of coverage;

Figure 65(d) illustrates a home or office networked home having antenna node devices connected at various terminal ends of a pre-existing coax network, and further illustrating the inventive capabilities of wireless signal handoff between two antenna node devices within the zone of coverage;

Figure 65(e) illustrates a home or office networked home having a combination of coaxial antenna node devices and phone line antenna node devices installed, along with a powerline connected rf repeater unit, for creating a zone of coverage throughout a home;

Figure 66(a) is a side view illustrating a antenna node device having a directional antenna disposed at a signal optimizing angle;

Figure 66(b) is a perspective view of the antenna node device shown in Figure 66(a);

Figure 66(c) is a perspective view of a antenna node device accessory antenna system for connecting with a pre-existing coax faceplate;

Figure 66(d) is a block diagram illustrating a antenna node device configuration comprising a wireless video/audio/data and control signal circuit for use within the inventive home or office network;

Figure 66(e)) is a block diagram illustrating a antenna node device configuration comprising a wireless video/audio/data and control signal circuit for use within the inventive home or office network, including a phone jack connection and a voltage peak filter for detecting dc control and data signals included as voltage peaks superimposed on a constant dc power supply signal;

Figure 66(f) is a graph illustrating the dc control and data signals included as voltage peaks superimposed on a constant dc power supply signal;

Figure 66(g) illustrates an obverse side of a printed circuit board construction of the inventive circuit for an embodiment of the antenna node device, the circuit including

a rf signal amplifier and rf mixer for optimizing the signal transmission carried over the coax network, while allowing for a wireless signal within a suitable bandwidth (e.g., 2.4 Ghz);

Figure 66(h) illustrates a reverse side of the printed circuit board construction of the inventive circuit shown in Figure 66(g);

Figure 66(i) is a perspective view of a antenna node device accessory antenna system for connection with a pre-existing coax faceplate;

Figure 66(j) is a perspective view of a antenna node device stand-alone antenna system for connection with a pre-existing coax terminal connector;

Figure 66(k) is a perspective view of a antenna node device directional antenna coax faceplate for replacement of a pre-existing coax faceplate;

Figure 66(l) is a block diagram illustrating a prototype construction embodiment of the inventive home or office network;

Figure 67(a) is a flowchart showing the operation of an inventive analog scrambler;

Figure 67(b) is an example of the sync signal and frequency adjustment in accordance with the inventive analog scrambler;

Figure 68(a) is a block diagram illustrating a antenna node device configuration for use with a phone line network, and including device locating circuitry for use in determining the location of devices within the inventive home or office network;

Figure 68(b) is a block diagram illustrating a antenna node device configuration for use with a power line network for communicating wireless and hardwired signals transmitted within the inventive home or office network;

Figure 69(a) is a flowchart showing the steps of determining the appropriate signal power transmitted from antenna nodes within the inventive home or office network;

Figure 69(b) is a flowchart showing the steps of determining the location of a device located within the inventive home or office network;

Figure 69(c) is a flowchart showing the steps of determining the appropriate signal power transmitted between antenna nodes and wireless devices within the inventive home or office network;

Figure 69(d) illustrates the determination of the location of a device by detecting the distance between the device and two or more antenna nodes within the inventive home or office network;

Figure 69(e) is a flowchart showing the steps of using a frame buffer to limit the display degradation due to the disruption of a video signal transmitted to a device connected to the inventive home or office network;

Figure 69(f) is a flowchart showing the steps of compensating for microwave oven interference when transmitting data to a device connected with the inventive home or office network;

Figure 69(g) is a flowchart showing the steps of compensating for microwave or other pulsating interference when transmitting video data to a device connected with the inventive home or office network;

Figure 70(a) illustrates the use of the inventive wireless display device for displaying Internet and intranet content in external network environments, such as schools, airports, airplanes, grocery stores and the like;

Figure 70(b) is a flowchart showing the steps of transmitting, receiving and displaying Internet and intranet content on networked display devices;

Figure 71(a) is a flowchart showing the steps of using Internet-based information triggers for controlling events within a networked home or office;

Figure 71(b) is a table showing examples of subscriber-selected online triggers;

Figure 71(c) is a table showing examples of subscriber-selected trigger events;

Figure 72(a) illustrates the transmittal of six frames of a video stream containing six pages of a website in accordance with the inventive method of transmitting hyperlinked content to multiple display devices;

Figure 72(b) illustrates a blank browser page used to navigate through downloaded page content;

Figure 72(c) shows display information contained in Frame 1 of Figure 72(a) displayed within the browser frame shown in Figure 72(b);

Figure 72(d) illustrates a single frame of the video stream shown in Figure 72(a) including the display information and non-display information corresponding to page contained within the frame;

Figure 72(e) illustrates the various links and their operation that results when the hyperlinks shown in Figure 72(d) are activated;

Figure 72(f) illustrates another series of web pages that are transmitted as video data;

Figure 72(g) shows a web page with the corresponding non-display data included along with the page;

Figure 72(h) illustrates how the binary video data stream can be conveyed using just the on/off states of the pixels of the video image;

Figure 72(i) illustrates a video stream containing display page information contained within the displayed area of the individual video frames, and hyperlink page information and other non-display page information contained in the non-display area of the video signal or video page stream;

Figure 72(j) illustrates a stream of video data provided along with hyperlink, page information and other non-videographic page information, with split static

videographic page information provided along with split moving image videographic page information;

Figure 72(k) shows a block diagram of an inventive display device for use with the inventive method of transmitting hyperlinked information;

Figure 72(l) illustrates a wireless display device receiving a window of moving image videographic page information superimposed on a screen of static videographic page information;

Figure 72(m) shows a PDA-type wireless display device displaying static and moving videographic page information;

Figure 72(n) shows a blank page of a high speed HTML browser window in accordance with the prototype FaceSpan software program disclosed herein;

Figure 72(o) shows an internet page having the grid locations of the page's hyperlinks determined and the page displayed in the browser window shown in Figure 72(n);

Figure 73(a) shows an inventive wireless display terminal capable of displaying a screen image composed of video data simultaneously received from two or more wireless sources;

Figure 73(b) is a block diagram illustrating an antenna node device for conditioning a wireless signal for communication over a pre-existing hard wire network; and

Figure 73(c) illustrates the use of the inventive antenna node devices in an office environment.

DETAILED DESCRIPTION OF THE INVENTION:

For purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, there being contemplated such alterations and modifications of the illustrated device, and such further applications of the principles of the invention as disclosed herein, as would normally occur to one skilled in the art to which the invention pertains.

The present invention pertains to a multimedia network that includes a computer node having a computer display local channel generator 10 that creates a local television channel of the computer monitor output (so that the computer can be displayed on any TV connected to the home coaxial network). A computer-controlled universal remote control signal generator generates device control signals that are carried over the coaxial network (so that the computer can control any IR or rf controlled appliance, like TVs, stereos and VCRs). A computer control signal receiver converts computer control

signals received from the coaxial network to computer input so that the user can control the computer located in the bedroom while sitting in front of the television in the living room.

A video device node having a device control signal emitter (for converting the universal remote control signals received from the coaxial network to IR signals for computer control of the TV, etc.). A computer control signal generator generates computer control signals that are carried over the coaxial. The computer control signal generator is controllable by a user's remote control input to enable remote control of the computer, and through the computer, remote control of any devices at the video device node or at other nodes, such as stereos, telephones, other VCRs and televisions, other computers, video cameras and home automation modules.

Some of the features enabled by the present invention, and described herein, are as follows. Through out this application, where appropriate, the term VCR is intended to include any video recording devices, such as DVD, hard drive and other random access and linear recording devices, and videotape is intended to include the various recording media utilized by the same. Computer-enabled VCR tape and video recorder content-indicating system. Computer-enabled VCR and video recorder commercial skip recording system. Computer-enabled commercial rebound (used while channel surfing, automatically returns viewer to the channel or origin after an elapsed time corresponding to a commercial break). A TV autopilot system allows the computer to control the TV automatically depending on the learned viewing habits of the user. A computer-enhanced phone system. Computer-enabled TV content and viewing duration parental controls. Home security/child monitor (computer automatically turns on selected TV(s) and displays person at door or baby crying). Throughout-home reference system (e.g., ask the computer to look up "Thomas Edison" and view a multimedia display at any TV). Internet-based alerts (computer automatically turns on (if necessary) selected TV(s) and displays current stock quotes, weather bulletins, traffic conditions, etc.). Computer-enabled TV alarm clock, sleep timer, etc. Email priority filter and automatic alert system. Computer-enabled individualized viewer preferences with favorite channels, program filtering, automatic show suggestion, automatic VCR control for recording for each member of the household. Home and work scheduling system with voice interaction. Multiple screen PIP on any TV. In-home video intercom. Internet-based video phone from any TV. VCR tape editing and duplicating system remote control code learning system (lets the computer learn the remote control code pattern for any networked device, greatly simplifies initialization).

The present invention is an effective and efficient means for putting computer-generated video output onto a local television channel carried on a pre-existing multimedia network (such as a coaxial cable network), controlling the computer remotely by signals sent over the multimedia network, and controlling televisions,

VCRs, stereos and related devices connected to the network via control signals generated in response to software instructions running on the computer. The present invention is comprised of a multimedia network that includes a modular system (one that has a basic configuration that can be built upon to add functionality) that is easy to install into the pre-existing home cable television network, or that can be included in wiring of a new construction.

In its basic form, the system lets any TV in the house act as a computer monitor, and allows the computer to control video devices such as TVs, VCRs, security cameras and cable set top boxes; audio devices such as stereos, CD players, telephone systems; and home automation systems, etc., located anywhere in the house. The output of any video device, audio device or computer on the multimedia network can be made available on any device on the network that is capable of using the output. For example, the TV in the bedroom can be used as a monitor to display Internet content and email messages received by the computer in the home office. The computer in the home office can be used to control the recording of a television program using the VCR in the living room. The stereo in the living room can be controlled from the bedroom via remote control signals received by and generated by the computer, and CDs played through the television speakers. A CD-ROM computer game can be displayed on the living room TV and played by a user in the living room.

In accordance with some of the features described herein, when a user chooses a television channel to view, rather than switching the television to that channel the computer generates remote control signals that automatically switches the TV to receive the output generated by the computer. At the same time, the computer controls a TV tuner associated with it to tune in the user's selected channel, and opens a video window that displays this channel. This video window, along with control windows, are mixed into the computer display output signal, and this output signal is converted into the local channel that is displayed on the user's TV. To enable picture-in-a-picture display capabilities, the computer tunes in a second television channel using a second TV tuner associated with it and opens a second video window displayed along side the first video window. A third, or more, PIP windows can be opened in a similar manner.

The size and shape of the video windows are automatically controlled via software instructions to enable the viewing of multiple PIP windows without missing any portion of the displayed programs or other video content. Alternatively, the PIP windows can be overlaid on top of each other in the manner of traditional television PIP displays.

More features of the inventive system include an in-home video intercom, TV speaker phone with caller-id, Internet video phone on any TV or computer, and meaningful home automation capabilities. In accordance with the present invention,

local television channels are created to carry video, audio, analog and digital data on the home coaxial network. For example, the local channels carry the video output of a computer from a computer node, and the video output of a video or audio device, such as a VCR or cable box, from a video device node. The video devices are remotely controlled by the computer through dc signals carried over the co-axial network. The dc signals are generated at the computer node under the control of the computer and then injected onto the coaxial network. At the video device node, the dc signal is filtered out and used to generate an IR pulse train for controlling the VCR, cable box, stereo system and/or TV. The computer is remotely controlled from the video device node using an IR remote controller or IR wireless keyboard. The IR signals are converted to dc pulses and injected onto the coaxial network at the video device node and the dc pulses are converted to IR pulses at the computer node. The computer is controlled through an IR receiver connected to the keyboard or other port. In an addressable configuration of the inventive system, each IR emitter that controls a device is connected to the dc control signals through an addressable control unit. For example, before a control signal is generated by the computer, an addressable control circuit dc pulse train is generated. Each addressable control unit is deactivated until it receives the correct addressable control circuit pulse train, and it then made active. When an addressable control unit is active it passes the next dc pulse train (the device control signal) to its IR emitter for controlling a particular video device. To determine from which device node the computer control signals are coming from, the addressable control unit is used to send an address-identifying pulse train to the computer over the network. The computer then knows from where the control signals originate (important for features like the in-home video intercom and computer multitasking by two simultaneous users).

In accordance with one aspect of the present invention, the local channels are carried by carrier frequencies that have been allocated as the television channel frequency spectrum. For channel efficiency, and to make set-up easy for the user, a selectable channel blocker is put onto the home co-axial network at the location of the cable provider source. This selectable channel blocker is controllable by the computer to selectively filter out the carrier frequency of the selected TV channels. The TV channels that are available for becoming local television channels are determined by running a set-up procedure in which the computer (with an installed TV tuner card) steps through each channel and determines which channels are unused by the cable system provider. Once the available local channels are determined, the selectable channel blocker is controlled to filter out one channel for the output of each device on the network that will be made available via a generated local television channel. When a new module is added to the network, it outputs an address-initializing signal until it is recognized by the computer and assigned its own address. If the module includes a

local channel generator, another available TV channel is selected from those that were determined to be available and is filtered by the selectable channel blocker. The carrier frequency of that new filtered channel is assigned to the new local channel generator and it is set to modulate the video output of a connected device to the new local channel. Alternatively, it is possible to just filter all channels above a certain frequency, for example, in a cable system that only goes up to channel 75, a low pass filter for channels 2-75 would be all that is needed. The selectable channel blocker is preferred in terms of effectiveness since it will be adaptable to any cable system, and changes to the available channels can be accommodated by re-initializing the system.

Figure 1 shows a block diagram of the basic configuration of the inventive multimedia network. In accordance with this configuration of the invention, at least one computer node and at least one video device node is distributed on the multimedia network. As discussed in more detail herein, the data transferred over the inventive multimedia network may include analog, digital, or a combination of analog and digital data. The direction of the data transfer may be bi-directional so that a device located at a computer node can send and receive data, for example, to and from a device located at a video device node.

In accordance with the present invention, the computer node includes a computer display local channel generating means 10, for generating a local television channel. The local television channel contains a video output signal that is generated by a computer located at the computer node. Generally, the computer display output signal is used to drive the display monitor associated with the computer. However, in accordance with the present invention, the display of the computer is converted to a local channel that is effective for allowing the displaying of video data generated by the computer on an ordinary television set located on the inventive home media network. The ordinary television may be located at a remote room in the home from the location of the computer. For example, the computer may be located in a home office or master bedroom, while the television that is used to display the computer video data is located in a family room or another bedroom.

The computer node also includes device control signal generating means 16 that are controllable by the computer for generating device control signals. These device control signals are transferable over the multimedia network and are effective to selectively control at least one video device located remotely from the computer on the multimedia network. The computer also includes computer control receiving means 12 for receiving computer control signals transferred over the multimedia network from, for example, a user input device 18 being used to control the remotely located computer while viewing the computer generated video information on the local television.

The inventive multimedia network also includes one or more video device nodes at which is located, for example, a conventional VCR, DVD player, television, and/or

cable television set top box. The video device node includes device control signal emitting means 14 for receiving the control signals transferred over the multimedia network from the computer node.

The device control signal emitting means 14 emits video device control signals that are effective to control a video device located on the multimedia network remotely from the computer. Thus, the video device can be remotely controlled by the computer. The video device node also includes computer control signal generating means 15. The computer control signal generating means 15 is controllable by a user input device 18, such as a wireless keyboard of remote control, the computer control signal generating means 15 generates the computer control signals that are transferred over the whole multimedia network so that the computer can be remotely controlled in response to user input.

Thus, in accordance with the present invention, a multimedia network is provided that allows an ordinary television to act as a computer monitor for a computer that is located remotely from the television. The computer also can control a remote video device located where the television is located. As will be discussed in more detail herein, the inventive multimedia network effectively allows the ordinary video devices, such as set up boxes, television, and VCRs already existing in the home to become computer enabled. This feature of the multimedia network unlocks the door for many useful and novel computer assisted features, without requiring a homeowner to reinvest in expensive video devices.

Furthermore, the video device nodes of the inventive multimedia network can include video device local channel generating means 20 for generating a video device local television channel that contains the video output of at least one of the video devices located at the video device node. As will be discussed in more detail herein, the inventive multimedia network enables ordinary and pre-existing video devices, such as television, VCRs, and set up boxes to be used for previously impossible enhanced multimedia viewing experiences.

In Figure 2(a) is a block diagram showing an inventive computer-enabled VCR system. In accordance with this aspect of the invention, a conventional pre-existing VCR is controlled under the direction of an external microprocessor 22 so that the VCR is imparted with enhanced video recording and playback capabilities. An example of these enhanced recording and playback capabilities is discussed herein with reference to Figures 4(a), and (b), wherein the VCR is controlled by the microprocessor 22 to selectively record and playback information that enables a user to determine the contents recorded on the VCR tape.

As shown in Figure 2(a), the inventive computer-enabled VCR system includes a microprocessor 22 that has associated with it some type of storage 24 device, such as RAM, hard drive, or the like. The microprocessor 22 controls a data signal generator

26 that is used to generate data signals that are recordable on a VCR tape inserted in the VCR, or that are recordable on the recording medium of a video recording device. The microprocessor 22 receives input from a data signal detector 28, which receives the recorded data signals during the playback of the VCR tape. A universal remote control signal generator, such as that typically found in universal-type remote controllers such as "Four-in-One" remote control available from Radio Shack, Catalog No. 15-1911A, so that most popular makes and models of VCRs and other video devices can be easily controlled. An infra red emitter connected to the universal remote control signal generator is placed in the location of the infra red detector of the VCR so that the infra red control signals generated through the control of the microprocessor 22 can be used to control the VCR.

Figure 2(b) is a block diagram showing a configuration of the inventive VCR/Internet appliance. In this case, an external stand-alone VCR control sub-system, as described above with reference to Figure 2(a), may be provided, or the components described herein may be incorporated in the VCR itself. In accordance with this configuration, a microprocessor 22 is used to control the operation of a storage 24 device, a modem, a video driver, and a VCR control circuit. The VCR control circuit is used to control a VCR control system, such as an ordinary VCR. The VCR's output is displayed on a TV. The video driver controlled by the microprocessor 22 enables the display of Internet content obtained through the modem. The storage 24 device is provide so that this Internet content can be cached to improve the performance of the system.

Figure 2(c) is a block diagram showing a multiple node wireless multimedia network in accordance with the present invention. In this case, location1 represents a computer node, and location2 and location3 represent video device nodes, as described in Figure 1. In accordance with this aspect of the invention, a wireless transceiver 32 at each node is used to transfer data between the devices and components on the multimedia network.

As shown in Figure 2(c), the multimedia network may be constructed of nodes that are in communication with each other through the use of radio frequency signals transmitted via wireless tranceivers 32. Alternatively, as described in detail herein, the multimedia network may consist of computer, video device and device control nodes that communicate with each other over coaxial, phone line, shielded cable, electrical wiring, fiber optic, IR, or other data transfer networks or any combination thereof.

Figure 2(d) is a block diagram showing a DVD recorder system controlled over the inventive multimedia network in accordance with the present invention;

Figure 2(e) is a block diagram showing a computer-enabled DVD or random access recorder system in accordance with the present invention.

Figure 2(f) is a block diagram showing a DVD/RAM/Internet appliance.

Figure 2(g) illustrates a variety of random access memory configurations for a random access video recorder in accordance with the present invention.

One of the features that make the inventive system particularly useful is a content-indicating recording system for recording and displaying content-indicating information to and from a videotape or other video storage 24 medium. In accordance with this aspect of the invention, television program information is received through a computer (networked system) or microprocessor 22 (stand-alone system) from the Internet or an electronic programming guide. The program information is converted into a recordable signal (such as an audible modem signal), and transferred over the multimedia network from the computer node to the video device node. A VCR at the video device node is controlled to record the recordable signal as an information header located at the beginning of a videotape, or as described herein, as information encoded on the videotape that corresponds to data stored on the computer or other remote storage 24 device. Preferably, the recordable signal is an HTML-type document, with hyperlinks that correspond to the television programs recorded on the videotape. When a videotape with the recorded information header is played back, the HTML file is uploaded from the VCR to the computer for display on a TV located at the video device node (via the computer local channel). The video recorder itself may be configured to generate the HTML display directly. The HTML document can include links to the Internet for related content relevant to the recorded show, suggestion of similar shows, etc. By activating one of the HTML's hyperlinks, the user selects a recorded TV show to watch. The computer receives the selection and controls the VCR to cue up the selected recorded TV show and begin playback. Using a determined user-profile (determined by a demographic questionnaire and/or by a data base of the TV viewing, movie renting and Internet usage habits of the household), the computer can be used to predict what shows the user might be interested in, and automatically control the VCR to record these shows. In this case, an Internet-based service can be provided that creates programming and other content suggestions that correspond with a statistical analysis of the user-profile.

Figure 3(a) is a block diagram of an inventive multimedia network that enables, among other things, the indicating of content recorded on a videotape. In accordance with this configuration of the inventive multimedia network, content information determining means 34 is provided for determining content-indicating information that corresponds to the content recorded on, or to be recorded on, a videotape. The content may include, for example, television programs that are selected by the user for recording through the use of an electronic programming guide or through access to an Internet website. The electronic programming guide or the Internet website will typically include a programming grid that indicates what the television programs are the are available for viewing on a cable or broadcast television system. In addition, the

inventive multimedia network can be used to provide for the recording of television programs based on a learned or pre-registered view profile. In the case of a pre-registered viewer profile, the user initializes the system by filling out a number of fields that correspond to television program viewing preferences. These fields are then used to determine what future television program or Internet content the particular viewer is most likely to be interested in, and the VCR recorder is appropriately controlled to record these types of television programs and/or bookmarks are generated corresponding to the Internet content. The learned viewer profile may be obtained separately or in conjunction with the registered viewer profile, by monitoring or otherwise keeping track of the television programs a viewer watches over time.

Thus, the content information determining means 34 obtains the content-indicating information for a particular television show, such as the show title, channel, date, time and a brief description of the show. This content-indicating information can be downloaded from the Internet, obtained from an electronic programming guide, entered in by the user or copied from a removable medium such as a floppy disk. Converting means 36 are provided for converting the detected content-indicating information into a recordable content signal. The Converting means 36 may be, for example, software running on a conventional personal computer. For example, if the content-indicating information is downloaded from the Internet, it can be easily incorporated into an HTML document that is saved as an HTML file. This HTML file can then be converted into a transmissible signal as is typically done when uploading such an HTML document to the Internet through the use of a modem. However, in this case, the HTML document is uploaded for recording on a videotape or other recording medium rather than for storage 24 on a server connected to the Internet. Generating means is provided for generating a recordable information signal for recording on the videotape. The recordable information signal includes the recordable content signal corresponding to the content-indicating information. Transferring means 40 is provided for transferring the recordable information signal to a recording head of a videotape recorder. For example, the information signal can be an audio signal, such as modem-like signal that converts an HTML file into a transferable audio signal. The audio signal is put onto the multimedia network through an appropriate connection so that it can be recorded onto the VCR tape in the video recorder located at the video device node under the control of the computer located at the computer node.

Figure 3(b) is a block diagram of the inventive multimedia network including the inventive video recording system for recording content-indicating information on a videotape. The configurations of the inventive multimedia network shown in Figures 3(a) and 3(b) also include Video device controlling means 42 for controlling the videotape recorder to record the recordable information. The Video device controlling means 42 may be, for example, a universal remote control signal generator that is

controllable by the computer located at the computer node of the inventive multimedia network. The VCR located at the video device node can be remotely controlled by the computer in the appropriate manner to effect the recording of the information signal. Cue information determining means 44 is provided for determining control cue information for automatically controlling a videotape recorder in accordance with the determined content-indicating information. The control cue information includes indications such as detectable tones that are recorded as part of the audio signal on the videotape to indicate control cues such "record start-header" signal, "record end-header" signal, and the like (described in more detail herein). The generating means includes recordable Cue signal generating means 46 for generating the recordable information signal including the recordable cue signal that corresponds to the control cue information. Thus, the recordable information signal includes the recordable content signal that carries the content-indicating information, and the recordable cue signal that carries the control cue information. The Video device controlling means 42 controls a device control signal generating means 16 that generates a control signal that is transferred via the Transferring means 40 over the multimedia network to a device control signal emitting means 14. For example, in the case of universal remote control signals, a dc signal may be generated under the control of the computer or microprocessor 22 through the Video device controlling means 42 and the device control signal generating means 16 (described in more detail below.) The various computer and device control signals may be generated directly as wireless rf signals, or may be converted from ir to rf signals as needed, depending on the particular configuration of the modules making up the inventive network. The control signal contains the appropriate information for controlling a particular VCR connected to the inventive multimedia network. For example, in the case of a dc signal transmitted over a hard wire network, the dc pulse information is transferred through the multimedia network and is received by the device control signal emitting means 14. The device control signal emitting means 14 emits the device control signals for automatically controlling the videotape recorder depending on the control cue information.

The information signal that is recorded on the videotape contains content-indicating information and control cue information so that the videotape recorder can be appropriately controlled to "upload" the content-indicating information (HTML data) back to the microprocessor 22 so that it can be detected and the content of the videotape displayed. The recordable information signal is played back and transferred by the Transferring means 40 to an information signal detecting means 68 for detecting the content-indicating information and the control cue information so that a representation of the content recorded on the videotape can be displayed, and so that the videotape recorder can be appropriately controlled. The recordable content signal and the recordable cue signal are combined through combining means 48 into the recordable

information signal, such as an audio signal, so that this information signal can be transferred over the inventive multimedia network from the computer or microprocessor 22 to the VCR and from the VCR back to the computer or microprocessor 22. The detecting means includes means for detecting control cue information from the information signal.

As shown in Figure 3(c) in accordance with the present invention, a multimedia network is provided for enabling the viewing of computer-generated data on any television or audio and/or video display device connected to the multimedia network. The multimedia network may be comprised of a pre-existing system such as a hard wired coaxial television cable network. The inventive multimedia network includes a computer node at which is located a general purpose personal computer, workstation or the like, or a function-specific microprocessor 22 running software dedicated to the functions described herein. The computer node includes computer display local channel generating means for receiving the video output of the computer and generating a computer display local television channel. The computer display local television channel contains a video output signal corresponding to a computer display output signal generated by the computer at the computer node. The computer display local television channel is essentially a new television channel that can be tuned in by any video or audio device in communication with the multimedia network. This local television channel is thus effective for allowing the displaying of video data generated by the computer on a television located on the multimedia network remotely from the computer.

The computer node also includes device control signal generating means 16 controllable by the computer for generating device control signals transferable over the multimedia network and effective to selectively control at least one video device, such as a VCR, TV or set top box, located on the multimedia network remotely from the computer. The computer node further includes computer control signal receiving means 12for receiving computer control signals transferred over the multimedia network. These computer control signals allow the computer located at the computer node to be controlled by a user located remotely at a video device node. The video device node includes device control signal emitting means 14 for receiving the device control signals and for emitting video device control signals effective for controlling the video device located on the multimedia network remotely from the computer. Thus, the video device can be remotely controlled by the computer. The video device node further includes computer control signal generating means 15 controllable by a user input device 18 for generating computer control signals transferable over the multimedia network. The computer control signals are generated in response to user input received from, preferably, a wireless input device such as an IR or rf remote control or keyboard. The user input received at the device node is converted, if necessary, into

signals that are carried via the multimedia network to the computer control signal receiving means 12 located at the computer node. The computer control signal receiving means 12 is in communication with the computer (such as through the keyboard or mouse port) so that the computer can be remotely controlled in response to the user input.

In accordance with the present invention, video device local channel generating means 20 generates a video device local television channel containing the video (including audio) output signal of the at least one video device located at a video device node on the multimedia network. The multimedia network can include multiple video devices at each of multiple video device nodes. For example, a satellite set top box in the living room of the house can be provided at one video device node, and its output put onto the multimedia network as a new television channel that can be tuned in by a television located in another room at another video device node. For example, the control of the satellite set top box is accomplished via control signals that originate as IR pulsed from a user-controlled remote control at the video device node of the television. These control signals are converted into dc signals and get passed via the coaxial network to the computer node where they are converted (if necessary) into signals that control the computer, and then, under the control of the computer, appropriate control signals are converted into dc signal and passed (again on the network) to the video device node of the satellite set top box where a device control signal emitter converts the signals again (this time into IR) and emits the control signals necessary to appropriately control the satellite set top box according to the user's instructions. Or, the IR signals can be converted into wireless rf signals for transmission.

To enable enhanced functionality, such as in-house intercom and speaker phone systems, voice activation and user identification, etc., a microphone input 50 is located at a location on the multimedia network for receiving microphone signals. The input of the microphone signals at a particular location (such as at a computer or device node, or anywhere connected to the multimedia network) is selected by Selecting means, such as a rely circuit in the case of a stand-alone device or through software control in the case of a microprocessor 22 or computer. Adding means 54, which may simply be a connection to the network controlled through the selecting means, adds the selected input of the microphone signals to the multimedia network. By this construction, a user can communicate through spoken words over the multimedia network. In the case of an in-home intercom system, means are provided for generating audible sound signals corresponding to the selected input of the microphone signals at a location on the multimedia network remote from the location of the at least one microphone input 50 receiving the selected input of the microphone signals. For example, the microphone input 50 that includes the voice of a user in one room can be carried over the multimedia network to the speakers of a television at a device node in another room where a second

user is located. The computer at the computer node can be used to control the various device to enable the two way communication between users at different rooms of a house that includes the inventive multimedia network.

To enable an in-home video intercom system, a camera input 56 is provided located at a location on the multimedia network for receiving video camera signals. The input of the video camera signals is selected by selecting means, and at least one of the computer display local television channel generating means and the video device local television channel generating means includes means for including the selected input of the microphone signals and the selected input of the video camera signals in the corresponding computer display local television channel and the video device local television channel. Using this construction, a two-way in-home video intercom is provided that utilizes the televisions and coaxial cable television network already in place in many homes. Of course, as with many of the embodiments shown herein, the transmission of video, audio, control signals and data can be accomplished via wireless transmissions, through the electrical wiring, phone lines, or other wired network, or through a combination of any of these signal transmission mechanisms.

A further enhancement feature of the inventive multimedia network is a system for providing a speaker phone system usable through-out the house. In this case, means is provided for connecting the selected input of the microphone signals to a pre-existing telephone system, and the speakers of a device located at or near the location of the microphone can be used to provide the audio of a phone conversation. To let the user know a phone call is coming in, means for notifying the existence of a received telephone call on at least one display connected to the multimedia system. For example, when a phone call is detected on the phone system, the computer at the computer node can tune its television software to the same channel as the television that the user is watching, and then generate a "phone call" message that is displayed along with the television program. The computer display local television channel includes the television program and the phone call message. The television is controlled via the computer to tune into the computer display local television channel so that the phone message is displayed on the television along with the TV show that the user is currently viewing. Means are provided for answering the received telephone call and selecting the input of the microphone signals received by the Microphone input 50. For example, a voice command or a button on the remote control can be used to answer the call. To further enhance the system, a caller-ID for determining a telephone number of a received telephone call can be included in the system along with means for displaying the determined telephone number on the television. For example, the phone number can be included along with the phone call message.

In a voice-recognition configuration of the inventive multimedia network, the system continuously "listens" via distributed microphones for a particular start-system

word or phrase, such as a name given to the system. A separate dedicated microprocessor 22 can be provided (for example, at each node or just a single one at either a particular computer or device node) that "listens" for this start-system phrase. Once received, the address of the receiving node is used by an addressable controller to locate the source of the start-system input. Alternatively, the input of each of the distributed microphones can be fed to a central or main computer or microprocessor 22 that awaits the reception of the start-system input. As another alternative, each microphone can be configured to include an identifying signal such as a pulse or frequency so that the location of the user can be determined.

The start-system input can be detected using voice recognition software running in the background of the main computer, or running on the dedicated microprocessor 22. Once the start-system input is received, the computer knows (via software instructions) that the next voice command is directed at it, and is not just part of the ambient conversation, television or noises. To make the system more efficient at recognizing the start-system input, the voice pattern of the particular user or users of the system (members of the household) can be learned through well-know voice recognition techniques so that if, for example, a television program produces the same words as the start-input, it will not cause the computer to anticipate a voice command. Alternatively, the system can be configured through software (or "hard wired") so that the start-system input must be followed by predetermined voice commands within a specified time duration, or else the computer will ignore the start-system input.

As an example, the system can be configured so that the following start-system input: "hello computer" followed within a 2 second duration by "display phone list", results in the following actions: 1) upon receiving the start-system input "hello computer" at a particular device node, the address of the device node where the microphone that inputs the start-system input is located is received by the addressable controller and the location of the user is determined; 2) the computer at the computer node is "told" (via software instructions) that if a recognized voice command is received within 2 seconds, it should perform the requested command; 3) since the recognized voice command "display phone list" is received within the allowed duration, the computer will perform the requested command; 4) to perform the requested command, the computer in this example will open a "phone list" file stored on its hard drive, and then make sure that the television or display at the particular device node is set to display the computer video output (that is, if it is tuned to the computer display local channel). If another recognized voice command inputted from the same microphone is received within an allowed-for duration (in this case, perhaps 15 seconds to allow the phone list to be displayed on the user's television and the user to peruse it), then that command is performed. For example, after perusing the phone list the user might issue the recognized voice command "call Jeff G.", which results in the computer finding Jeff

G's phone number from the phone list, connecting the microphone at the user's location to the home phone system and dialing the number. If the 15 seconds passes without a command, the computer can be programmed to ask (via synthesized voice outputted to the television speakers, "would you like me to dial a number?." If an appropriate voice command is received, the computer will perform the requested operation. If not, the system must be re-started by the start-system input ("hello computer").

To enable the exchange of data between the user and the Internet at any television connected to the inventive multimedia network, means is provided for connecting to the Internet and downloading Internet data. For example, a modem can be included in a device located at one of the computer or video device nodes. Internet video output signal generating means 58 receives the Internet data and generates an Internet video signal dependent thereon (along the lines of the recently introduced product called WebTV).

Recently, relatively high speed cable modems have become available that allow set top boxes, computers or other devices to connect to the Internet via the cable television network. However, in the conventional configuration used with these cable modems, the Internet is displayed only on the device connected to it. For example, in the case of a set top box, computer or Internet appliance cable modem connection, the video output containing the Internet web pages is displayed only on a single connected display device. Conventionally, a viewer could only control the access to the Internet and view the downloaded web pages from the connected display device. However, in accordance with the present invention, the device local channel generating means includes means for generating the video device local television signal containing the Internet video output signal data. Thus, this local television channel can be tuned into by any television or display device connected to the inventive multimedia network. Further, the access to the Internet can be controlled from the location of the television through the use of control signal generating and detecting means as described herein.

The computer at the computer node of the inventive multimedia network can have access to the Internet and other on-line networks via means for connecting the computer to the Internet and downloading Internet data. For example, the computer may be configured with an internal modem, and/or an external modem may be used. The internal modem may be used for a connection to the Internet via the telephone lines, and, if provided, the external modem may be a cable or wireless modem, or other Internet data transfer device. The computer display local channel generating means includes means for generating the computer display local television signal containing the Internet video output signal data. In a basic version, the Internet video output is just the computer display output that normally is displayed on a computer monitor in direct connection with the computer. However, in accordance with the inventive multimedia network the computer display output is converted into a local television channel so that

any display connected to the network can tune in the channel and display the Internet video output.

In the case of a dual modem system, two users located at two different nodes of the inventive multimedia network can be accommodated with an individual connection to the Internet. If both connections are made through the same computer, the computer can be configured and controlled so that it can drive multiple monitors. Each monitor output can be converted into its own computer display local television channel, and each user tunes the TV or display device located at their particular node to one of the channels. The computer can be controlled in a multitasking manner so that each user is able to access the Internet (or use, for example, word processing software or other applications) on an individualized basis. The addressablility of the inventive system will allow the detection of computer control signals and appropriate control of the computer depending on the desires of each user. In this case, the computer operates much like a mainframe system, with the display and input device at the nodes acting as "dummy" terminal . As is shown in Figures 3(k) and 3(l), a single modem or internet connection can be used by two or more users of the inventive multimedia network. In this case, a single modem and a single computer are used to connect with an Internet service provider. The computer is set to display on multiple monitors, allowing separate local channels to be generated for each monitor output. Two or more users each access the local channel (or the computer monitor located at the computer) to view a respective monitor output. If two or more users are using the single modem/computer for access to the Internet, each of their respective monitors will show a different web browser window. The web browser window could be generated through a single web browser application, or two different web browser applications can be running simultaneously on the single computer.

The present invention provides a method for indicating the content recorded on a videotape and also provides a video recording system for recording content-indicating information on a videotape. The videotape content-indicating features can be included in the inventive multimedia network system, enabling a host of useful enhancement to the multimedia viewing experience. For example, the content of television programs recorded on a videotape can be determined from information stored on the videotape itself. This information is generated, in accordance with a preferred embodiment, by a computer located at a computer node and transferred over the multimedia network, such as a pre-existing coaxial cable television network, for recording on a VCR located at a video device node. The VCR is controlled via the computer in the manner described herein so that the content-indicating information is included, along with control cue signals, on the videotape. To determine the content of the videotape, the VCR is controlled via the computer to playback the content-indicating information in accordance with the control cue signals (which mark, among other things, the beginning and

ending of the recorded information signal that includes the content-indicating information). In the preferred embodiment, the content-indicating information consists of HTML code that includes hyperlinks for controlling the VCR to cue-up and playback a selected recorded television show. The HTML code can be automatically generated by inserting specific instructional code (such as fast forward time, play time, rewind time, tape identification data, recorded content identification data, related links, etc,) into a HTML document template. Further, portions the HTML document can be downloaded from the Internet. For example, a website can contain the particulars of a specific show that is to be or that has been recorded. This website may include identifying content that is specifically formatted for inclusion with the content-indicating HTML document. This identifying content (which may be text, graphics, java code, etc.) can be downloaded from the internet when a show is selected for recording. This identifying content may then be incorporated into the HTML document, or the appropriate control signal information can be appended to an HTML document generated in accordance with the identifying content, so that the VCR or video recorder can be appropriately controlled to cue up the recorded show.

In accordance with the inventive method for indicating the content recorded on a videotape, the content-indicating information is first determined corresponding to the content recorded on, or to be recorded on, a videotape or video recorder. The determined content-indicating information is converted into a recordable content signal, and a recordable information signal is generated for recording on the videotape. The recordable information signal includes the recordable content signal corresponding to the content-indicating information. The recordable information signal is transferred, either directly or over the inventive multimedia network, to a recording head of the videotape recorder. The videotape recorder is controlled to record the recordable information.

In the case of a preferred embodiment of the inventive multimedia network, the device control signal generating means 16 is a universal remote control signal generator that has been initialized to control the VCR located at the video device node. If necessary, the output of the universal remote control signal generator is converted from IR to dc or rf signals. The universal remote control signal generator is controlled by the computer at the computer node and used to generate dc device control signals. The dc device control signals are transmitted from the computer node to the video device node over the coaxial cable television network. At the device node, the dc control signals are received by the device control signal emitting means 14 and used to drive an IR emitter. The IR emitter is placed so that the IR pulses are received by the IR detector of the VCR. Usually, the IR detector of the VCR is provided by the manufacturer so that the VCR can be controlled by the user via a hand-held remote controller. In accordance

with the present invention, this same remote control system of a conventional VCR is utilized so that a remotely located computer can control the VCR.

In order to appropriately control the VCR during the later play-back of the content-indicating signal and recorded content, control cue information is determined. The control cue information may be an audible or inaudible tone signal that is recordable on the VCR tape. The control cue information is used for automatically controlling the videotape recorder. The recordable information signal is generated to include a recordable control cue signal corresponding to the control cue information. This recordable information signal thus includes both the content-indicating signal and the control cue signal.

In the preferred embodiment of the present invention, the content-indicating information comprises HTML data. This HTML data corresponds to a web-like page that is viewable by ordinary Internet browser software, or by custom software. The web-like page includes hyperlinks to related Internet, intercast or removable media content that pertains to the television programs or other content recorded on the videotape. The hyperlinks are also used to provide user-input for the control of the video recorder via the computer and inventive multimedia network. For example, the hyperlink for a recorded TV program, program1, includes information that corresponds to determining the location on the videotape of the beginning and ending of program1. For example, the information may be the time it takes to fast forward to the beginning of the program from the start of the tape (or other determined location on the tape), the duration or counter-value of program1, the counter-value of the beginning and ending of program1, a certain tone frequency or tone pulse that indicates the beginning and/or ending of program1, a video signal that indicates the beginning and/or ending of program1, etc.

Once the videotape has been recorded to include the information signal, the content recorder on it can be determined and displayed for the user. The display can be via the inventive multimedia network in which case the computer display local television channel is tuned in by the TV (perhaps under the control of the computer in response to user-input) and the web-like page display from the computer video output is shown on the television. In this case, the video recorder is controlled to playback the recordable information signal including the recordable content signal previously recorded on it. The recordable information signal is transferred to an information signal detector and the content-indicating information is detected from the recordable content signal so that a representation of the content of television programs recorded on the videotape can be displayed. In a preferred embodiment, the HTML data is transferred between the computer and VCR using an appropriately controlled modem. Alternatively, the spk and mic ports (or other data ports) of the computer can be used to input and output the HTML data for recording and playback on the VCR. Since the recordable information

signal includes the recordable control cue signal, the control cue information is detected (by detecting the tone frequency, pulse, video data or whatever the control cue information is) for controlling the videotape recorder. The videotape recorder is automatically controlled depending on the control cue information. For example, the audio-in capabilities of a conventional computer can be used to receive the recorded information signal. Frequency filtering software can be used detect the particular frequency and/or pulse data of the control cue information. Alternatively, an external audio filter circuit can be used, which detects the particular frequency and/or pulse data.

The HTML document can also be recorded as a video image stored on the videotape. Each of the recorded shows can be designated with a particular page that is stored as a frame, or multiple frames, of video data. The recorded content on the videotape can be ascertained by scrolling through these frames, using for example, the slow motion or frame by frame play capabilities of the VCR. The computer can keep track of which page is being displayed, and in accordance with the content-indicating information and information for the particular VCR model such as its fast forward tape speed, knows how to control the VCR to cue up the selected program.

In accordance with the present invention, a video recording system for recording content-indicating information on a videotape is provided. The inventive system includes content determining means, such as computer software or a microprocessor 22 circuit for controlling the connecting, selecting and downloading of information, such as an HTML page containing television programming information from a network, such as the Internet, or from an electronic programming guide from a network, such as a cable television network, or from a removable medium such as a floppy disk. The content determining means may also be configured for allowing a user to manually input the determined content, to allow for, for example, the determining of content pertaining to a camcorder recording. The content determining means determines content-indicating information corresponding to the content recorded on or to be recorded on a videotape. For example, in the case of an HTML page, a user selects from the downloaded HTML page data about a particular television show that is to be recorded. This data determines such content-indicating information as a show description, date, channel and time that it will be aired.

Converting means 36 converts the determined content-indicating information into recordable content data. The converting means 36 may be, for example, a computer modem, or computer software or a microprocessor 22 circuit that converts the HTML page data into recordable content data. The recordable content data may be an audible signal that can be outputted from a speaker port, and/or a video signal that can be outputted from a video port. The recordable content data can be converted into any analog or digital data that can be recorded on a videotape. Stated otherwise, the converting means 36 takes the HTML page data (which can be viewed using browser

software, for example, on a computer monitor) and converts it into data that can be recorded on a videotape. In the case of the HTML page data, the Converting means 36 may be a microprocessor 22 circuit or software controlling a computer to parse or select the content-indicating information and creating an HTML page that contains the content-indicating information, the recordable content data is included in this created HTML page.

Generating means generates a recordable information signal for recording on the videotape. The generating means includes content signal generating means for generating a recordable content signal corresponding to the recordable content data. The generating means may be, for example, a microprocessor 22 circuit or software for controlling a computer to generate an audible modem-like signal that contains the created HTML page, in the case of a computer, the computer's speaker port and sound capabilities can be used to generate the recordable information signal, or a conventional modem or modem-like device can be controlled by a microprocessor 22 circuit or computer so that the created HTML page is modulated into a recordable signal.

Transferring means 40 transfers the recordable information signal to a videotape recorder. In the case of a home coaxial cable television network, the transferring means 40 includes a connection to the coaxial network. In the case of, for example, of the wireless transfer of the recordable information signal, the transferring means 40 includes a rf or IR transmitter. If necessary for transferring the data, the generated recordable information signal may have to be converted into a suitable signal form, such as an rf signal, that can be transmitted wirelessly from the transmitter to a remote receiver.

Video device controlling means 42 controls the videotape recorder to record the recordable information signal. The video device controlling means 42 may be a microprocessor 22 circuit or software controlling a computer to generate the appropriate control signals that effect the recording via the video recorder. As described herein, device control signal generating means 16 and device control signal emitting means 14 can be utilized to generate the appropriate control signals that are transferred over the multimedia network (for example as wireless rf signals or dc signals that can be transferred over the coaxial network) and then emitted as IR remote control signals that control the videotape recorder to record the recordable information signal.

Cue determining means controls control cue information for automatically controlling a videotape recorder. A microprocessor 22 circuit or software controlling a computer can be utilized to determine the control cue information. The control cue information, as described in the flow charts below, is used to determine where on the videotape the program content and the content-indicating information is located. The generating means includes means for generating the recordable information signal including cue signal generating means 46 for generating a recordable control cue signal

corresponding to the control cue information. The recordable control cue signal may be, for example tones or video data can be recorded on the videotape and later detected so that the location on the tape of the program content and the content-indicating information can be determined during playback. The cue signal generating means 46 may be, for example, a tone signal generator (such as a modem or speaker driving circuit) or video signal generator (such as a video driver circuit) that is controlled by a microprocessor 22 circuit or software controlling a computer so that the appropriate control cue signals are generated at the appropriate times. Combining means 48 combines the recordable content signal with the recordable cue signal to generate the recordable information signal. The Combining means 48 may be, for example, a microprocessor 22 circuit or software for controlling a computer so that the recordable content signal is generated with the appropriate control cue signal.

The video device controlling means 42 includes playback controlling means for controlling the video recorder to playback the recordable information signal including the recordable content signal previously recorded on the videotape. Detecting means detects the content-indicating information from the recordable information signal so that an indication of the recorded content of the videotape can be displayed. The transferring means 40 includes means for transferring the recordable information signal to an Information signal detecting means 68.

The detecting means includes means for detecting control cue information from the recordable information signal. For example, a frequency filter (either hardware, software or both) may be utilized to determine the specific tone or video frequency of the recorded control cue signal. Device control signal emitting means 14 emits device control signals for automatically controlling the videotape recorder depending on the control cue information under the control of the computer.

Figure 3(d) is a block diagram illustrating the connecting through a communications network such as the Internet or telephone lines connection to another multimedia network of the inventive multimedia network shown in Figure 3(c), and showing a video telephone conversation between a user located at the multimedia network shown in Figure 3(c) with another user located at the other multimedia network. The inventive multimedia network can be connected over the Internet or via some other network connection to another multimedia network. Thus, a videophone system can be configured that allows two users in separate houses down the block or around the world to take part in a video conversation. The data carried over the local television channels can be analog or digital, and since the coaxial cable is capable of transmitting data at frequencies above and below those of the television spectrum, the coaxial cable network can be used to carry analog or digital data that is not necessarily a local television channel.

As shown in Figure 3(d), the existence of a user in the vicinity of one of the network nodes can be determined through a user sensor. The user sensor may include a physical motion sensor, an image motion sensor (for use with the CCD camera), a sound sensor (which can use the output of the microphone), an ir sensor (which may utilize the components of the ir signal detector), an ultrasonic sensor, or the like. In any of the embodiments shown herein, such a user sensor can be available to detect when and where a user of the inventive network is located. Further, upon detection of a user, the computer can be used to generate a question (via audibly or visually displayed information) requesting the user to identify himself or herself. The computer can then set various user-preferences for operating the various devices controlled by it to that particular user. Thus, for example, when an alert event occurs (described below), the inventive system will be able to determine the location of the user for which the alert message is being generated. The closest display (television, stereo, speakers, phone) relative to the user can be determined and use to provide the user with the alert message. Alternatively, the personal locators shown and described herein can be utilized to determine who, when and where a user is. The CCD camera can also be utilized to determine the existence and the identify of a user through an image recognition system. In this case, the image recognition system is initialized by capturing video graphic data of each particular registered user of the network. When a user first come into the view of the CCD camera at one of the network nodes, this video graphic data is used to determine the identity of that user. If the system fails to determine the identity of the user, then it can be set to request the user to identify himself or herself. Similarly, the voice pattern of the users registered with the system can be used for user-identification purposes.

Figure 3(e) is a block diagram showing a mixed network system for connecting various nodes of the inventive multimedia network, including a connection between a computer node and a first device node via data transferred through a home electrical wiring network and a connection between the second device node and the first device node via a home co-axial cable connection. In this configuration, the computer can be located at a computer node in a room in the house that does not have a pre-wired coaxial connection. The computer receives a television video signal via a bi-directional home electrical wiring signal Transferring means 40 that allows video and audio signals (as well as control signals and data) to be transmitted over the existing home electrical wiring. At at least one video device node, bi-directional home electrical wiring signal Transferring means 40 are also provided for transferring video and audio, as well as control signals and data, to and from the video device node over the home electrical wiring. Also at this video device node is a bi-directional home coaxial wiring signal Transferring means 40, for transferring video and audio, as well as control signals and data, to and from the video device node over the home coaxial network. Signal transfer

bridging means 70 70 is provided in communication with both the bi-directional home coaxial wiring signal Transferring means 40 and the bi-directional home electrical wiring signal Transferring means 40 at this video device node. The Signal transfer bridging means 70 70 allows the audio, video, control and data signals to flow between the home electrical wiring and the home coaxial wiring. By this configuration, the computer node is able to communicate video, audio, control and data signals with any appropriate device connected to the home coaxial network, even though the computer node is not directly connected to the coaxial network. Also, any device that is can be connected to the home electrical wiring can be in communication with any device that is connected with the home coaxial wiring. Depending on the available wiring, the signal transfer bridging means 70 may be effective for transferring signals between any combination of electrical wiring, phone lines, wireless transceiver 32, co-axial cable or other wired network. In any case, the signal transfer bridging means 70 allows devices to have access to a indirect network connection with the other devices on the network.

To further simplify the construction and operation of the inventive multimedia network, fixed carrier frequencies can be utilized for carrying locally generated audio and video content. The fixed carrier frequencies can be outside the range allotted for television signals and thus prevent any need for selection, filtering out, or removal of content from the television channels that are available from any particular cable television provider. Further, since only a limited number of carrier frequencies will be needed, a simple tuner can be provided for tuning in the local content channels. In addition, the centralized computer control of the system will be greatly simplified, since the local content channels will have to be received and tuned in by a device that is specifically built to work with the inventive multimedia network.

As an example of a simplified system, a number of fixed audio and/or video channels are generated by the computer and injected onto the home electrical wiring (or phone line or coaxial, etc.) network. Each device node includes a frequency filter that only allows one of the fixed channels carrier frequency to pass. This specific fixed channel is only receivable by one receiving device located on the network. Thus, to control the content viewed, for example, at a television located at a specific device node, the computer controls the content carried on the frequency that is accessible only at that specific node. The receiving device converts the audio and video content carried on the fixed channel into a typically used TV channel, such as channel 3 or 4, that is provided to the TV, VCR or set top box via a coaxial connection (as is typically done with conventional VCRs and set top boxes). Alternatively, the receiving device converts the audio and video content carried on the fixed channel into a conventional audio-out and video-out signals that can be inputted to a VCR or TV through, for example, an RCA jack or S-Video connection.

The control signals can be in the form of voice recognition (speech), and the speaker phone components described herein utilized to inject the microphone or audio input on the inventive multimedia network. A wireless connection can be made with one or more speaker channels so that stereo or surround sound acoustics can be easily obtained without running a lot of speaker wires.

Also, a series of audio-only channels can be generated by the computer and injected onto the inventive multimedia network. These audio frequencies can be in the frequency range that is tunable by, for example, any conventional FM radio. These audio-only channels can be used, for example, to carry streaming audio content from the Internet to any room that has a speaker in it. The audio channels can alternatively be of a frequency that is not typically used for FM radio or television signals, and a dedicated tuner can be provided at the nodes to tune in the computer-generated audio signal. The audio-only signals will require component circuitry that is less complicated and expensive to manufacture, as compared with the audio/video carrying local channels. These audio-only channels can be used to enable the telephone, music, radio, intercom, etc., functionality of the inventive multimedia network described herein. Further, these audio-only channels are particularly useful in connecting the wireless or other non-coaxial network-connected nodes since the cost of the circuitry infrastructure needed for transmitting audio only signals is considerably less complicated and costly as compared with video and audio signals.

Further, simple LCD or LED display devices can be used to indicate the television channel, Internet streaming audio channel, telephone caller id and number, volume, etc. These display devices can be controlled by simple control signals generated by the centralized computer and carried over the wired or wireless transmission network work connection.

Figure 3(f) shows an example of a relatively less complex wireless configuration of the inventive multimedia network. In this case, a transceiver 32 is connected with the microphone and speaker ports of a conventional computer of a computer node located, in this example, in the bedroom. The transceiver 32 may, alternatively or additionally, be connected to other communication ports or may be an internal add-on card or even consist of components directly connected to the computer motherboard. A device node consisting of a VCR and television is located remotely from the computer, in this example, in the living room. The device node includes a transceiver 32 unit that is connected with the audio ports of the VCR. The transceiver 32 unit may, alternatively or additionally, be connected to coaxial connections or RCA-type jacks of the television and, if present, with a set top box. In this basic configuration, the transceiver 32 unit is provided for receiving remote control signals from a remote control unit. In this example, the remote control unit includes a

microphone for allowing user-generated voice input to be used as control signals in controlling the devices and computer(s) on the inventive multimedia network.

As shown in Figure 3(g), the buttons of the computer are manually controlled by the user to generate either a specific rf frequency, tone frequency or rf or IR pulse train that are used as control signals. If tone frequencies are used as control signals, the tone frequencies generated by remote control unit(s) and/or the transceiver 32 unit(s) are preferably beyond the range of human hearing. The transceiver 32 units located at the device node and/or at the computer node receive the remote control generated control signals.

Figure 3(h) shows the basic circuit components of this configuration of the inventive multimedia system for allowing the control of a computer from a remote location and the computer control of remotely located device as described herein. In accordance with this aspect of the invention, an effective voice activation control system is enabled, since the source of the voice signals, the user, is close to the microphone during use of the remote control unit. The voice recognition module may be disposed within the remote control unit. The set top box or computer transceiver 32 unit may receive voice and control signals via a wireless transmission from the remote controller (or from the remote controller to the set top box transceiver 32 unit to the computer transceiver 32 unit) for voice recognition and control signal purposes.

Figure 3(i) is a block diagram of an embodiment of the inventive multimedia network having a computer node with multiple TV tuners. The multiple TV tuners may be incorporated onto individual add-on cards, provided directly on the computer motherboard, or provided as stand-alone external units. Further, in accordance with the present invention, a TV tuner card can be provided having two or more TV tuners incorporated thereon. Each TV tuner can be capable of tuning in the same or different TV channels for display as a multiple screen display on a single TV or computer monitor, or as a separate screen displayed on separate TVs (via separate local channels) and/or separate monitors. In this configuration, a manual user selectable local channel Frequency selection means 74 is provided for assigning the local channels containing the computer video output and the device video output in a manually defined manner.

Figure 3(j) is a flow chart showing the initialization of the multimedia network configured as shown in Figure 3(i). In this case, the user installs the system modules at the computer node(s) and device node(s) throughout the house. The user then determines which TV channels are available for carrying the local computer channel(s) and the local device channel(s). The user then selects an available channel for each node using a manual local channel frequency selection switch that sets a local channel Frequency selection means 74 to the user determined local channel. The computer video local channel generator is thus set to output the local video and/or audio information generated by the computer or device at a carrier frequency that is manually

chosen by the user. A separate microprocessor 22 unit may be provided for automatically detecting and assigning the available channels to the computer(s) and device(s) connected to the inventive multimedia network. The software initialization routine is run on the computer where the software prompts the user to input the selected channels and the corresponding node information so that the computer "knows" which channel is assigned to the output of which computer or device connected to the inventive multimedia network.

Figure 3(k) is a block diagram showing an embodiment of the inventive multimedia network configured for allowing multiple simultaneous users of a single computer with separate computer generated video information displayed on three remotely located televisions or other display devices connected to the inventive multimedia network. In accordance with this aspect of the present invention, a single computer can be used to display video and/or graphics (word processor documents, web pages, schedules, spreadsheets, multimedia displays, etc.) simultaneously on two or more display devices. For example, a user located in the bedroom (TV1) can view a web page using a conventional web browser via a monitor1 local television channel. While viewing the web page, the first user also has a television program and a video intercom conversation displayed in PIP format. In another bedroom (TV2) as second user works on a word processing document while viewing a child monitor camera output along with a TV program in PIP format. The TV program in this case happens to be the same show as the child are watching on so the parent can monitor the children's viewing habits. The determination of which show the children are watching is done by detecting which channel the children's TV is switched to by detecting the control signals (with computer generated or remote control generated) used to control the children's TV, VCR or cable set top box.

In the living room (TV3), the children are viewing the television program along with its associated web page. The parent in the bedroom can also switch to the same TV channel as the children are viewing at any time so that anything that the children are viewing is monitored by the parent.

Figure 3(l) is a flow chart for enabling multiple simultaneous users of a single computer with separate computer generated video information displayed on three remotely located televisions or other display devices connected to the inventive multimedia network.

Figure 3(m) is a block diagram of the inventive multimedia network having a device remote control signal detector and a device status detector for enabling the computer to determine the status of a device, such as its on/off state, and the operation of the device, such as remote controlled channel selection, for a device connected with the inventive multimedia network. A Light detector 76, consisting of a photodiode, can be adhered to the surface of the TV screen and/or an acoustic detector can be positioned

near one of the TV speakers, or, if available, connected to a spk out jack of the TV, or stereo. As described below, some of the features of the inventive multimedia network work best if the on-off state of the TV(s) can be determined. Another way to determine the on-off state of the TV is to keep track of the control signals received by the TV (either computer generated or generated by a user controlled remote controller. In this case, the circuitry described below with reference to Figures 41(a) - 41(b) can be employed.

Figure 3(n) is a block diagram of an embodiment of the inventive multimedia network utilizing local television channels that are outside the frequency range of normally received television channels. One of the problems associated with the use of the allotted television channels is the fact that different cable television signal providers use different cable channels for carrying their programming content. This makes it necessary to determine which of the possible allotted channels is being used for television content and which are available for carrying the locally generated channels. Further, as the program selection increases, the number of available channels decreases, making for a potentially unstable multimedia network system. In accordance with one aspect of the invention, the available channels are determined using a TV tuner connected with the computer. The allotted TV channel frequencies are sequentially tuned in, and if a viewable signal is detected, the channel is categorized as "unavailable" for carrying a local channel. If a viewable channel is not detected, the channel is categorized as "available" for carrying a local channel. This scanning of the allotted channels is well know in the art, and typically found as a feature on modern televisions and VCRs.

In accordance with this aspect of the present invention, the "available" channels are determined by the computer or an external microprocessor 22 that functions along the lines of the "scanning" systems well know in the art. Once the available local channels are determined, the microprocessor 22 or computer assigns a channel to each local channel generating device. The devices are given user selected name representations, such as "computer", "bedroom VCR", "living room DVD player", etc. so that the users do not have to remember which channel is associated with which device. Further, a system maintenance feature can be provided for periodically scanning the allotted television channels to ensure that no new channels or other changes have been made by the cable television provider. In the event that a channel change is detected that interferes with one or more of the locally generated channels, the maintenance system automatically re-allocates the channels, and either alerts the user to change the local channel frequency for a particular device (manual configuration) or sends the appropriate command signals to make the appropriate changes.

However, as shown in Figure 3(n), a simplified system is obtained by using local channels that are outside the range allotted to TV channels. In this case, the

inventive system box at the local audio and/or video source (computer, VCR, stereo, etc.) includes an a/v signal modulator that is capable of creating a signal that can be transmitted over, for example, the home coaxial network, but that is outside the allotted frequency range of television signals. At the display device end (TV, stereo, VCR, computer, etc.) a demodulator or audio and/or video signal tuner is provided having tuning characteristics that enable the signals that are carried by frequencies not in the allotted TV band to be tuned in and demodulated. The demodulated audio and/or video signals can be converted at the display end to a channel that can be tuned in by a typical device, such as the conventionally used channels three and four for VCRs and set top boxes, or an appropriate radio station. Alternatively, the demodulated a/v signals can be inputted to the VCR (or TV etc.) through the a/v in jacks (in a manner similar to connecting a video camcorder to the RCA jacks of a VCR). This configuration of the present invention allows a more efficient use circuit components since the local channels are not subject to change with different cable television providers. Further, since the allotted cable television channels are untouched, they are still available for line up changes by the cable system provider.

In accordance with this aspect of the inventive multimedia network, a computer node is provided including computer display local channel generating means for generating a computer display local television channel. The computer display local television channel contains an output signal (audio and/or video) corresponding to the computer display output signal generated by the computer located at the computer node. Alternatively, the local channel may be an audio only channel. The computer display local television channel comprises of a local carrier frequency that is outside the frequency range allotted to cable television channels that is used to modulate the audio and/or video data generated by the computer. If necessary, a scan converter or other well know device can be provided to convert the video data generated by the computer to a signal that can be modulated by the carrier frequency so that it will be transferable over the home network, such as the home electrical wiring, telephone line or coaxial cable network. The computer display local channel allows the video data generated by the computer to be displayed on a television located on the multimedia network remotely from the computer. Since, in this embodiment, the computer display local channel is not tunable by a conventional television, the output signal from the computer must first be demodulated from the local carrier frequency by demodulation means. The demodulation means removes the local carrier signal from the audio and/or video signal that was output by the computer. This demodulated output signal can be fed to an appropriate a/v in jack of a conventional VCR (such as an RCA-type jack) or to an appropriate a/v in jack on some televisions.

The computer node also includes manual channel Selecting means for manually selecting the local carrier frequency for the computer display local television channel.

In this embodiment, the computer display local television channel is one of a predetermined set of local carrier frequencies. Stated otherwise, either a set of frequency generators or a variable frequency generator is provided to generate the local carrier frequencies that are outside the range of frequencies allotted to the television channels that are normally tunable by a conventional television. The frequency generators are of known construction, and may be simple circuits that are dedicated to output a signal preset carrier frequency. For example, a carrier frequency of 850Mhz may be used as one of the local channel frequencies. Thus, a frequency generator is provided that outputs the 850Mhz frequency is manually selectable by the user. Alternatively, the computer can be used to assign the local carrier frequencies, and the addressability of the units at the nodes utilized to ensure that each of the available frequencies is assigned to only one device output, or that if two devices are assigned the same local channel frequency, they are not both outputting the local channel at the same time (this way, more devices than there are local carrier frequencies available can be connected to the network at one time, with the computer keeping track of which device is assigned which frequency)

The computer node also including device control signal generating means 16 controllable by the computer for generating device control signals transferable over the multimedia network and effective to selectively control at least one video device located on the multimedia network remotely from the computer. The computer node further including computer control signal receiving means 12for receiving computer control signals transferred over the multimedia network.

A video device node including device control signal emitting means 14 receives the device control signals and for emitting video device control signals effective for controlling a video device located on the multimedia network remotely from the computer so that the video device can be remotely controlled by the computer. The video device node further include computer control signal generating means 15 controllable by a user input device 18 for generating computer control signals transferable over the multimedia network so that the computer can be remotely controlled in response to a user input.

In accordance with this aspect of the invention, the video device node may further include Node modulation means for converting the computer display local channel to a television frequency of channel 3 or channel 4. In this case, the computer display local channel is received having a frequency that is not tunable by the television or VCR, but this signal is converted to channel 3 of 4, as is typically done in conventional video device.

Figure 3(o) is a block diagram showing a configuration of the inventive multimedia network for directing data to and for controlling devices capable of recording one type of data to record data not normally recorded by the device. In

accordance with this aspect of the invention, the computer is utilized for directing the reception of video, audio, digital data, modem and modem-like signals, etc. to a recording device connected to the inventive multimedia network. For example, a VCR tape or random access video recorder can be employed for recording a radio program and/or songs from a CD player.

Figure 3(p) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wirelessly linked computer; the wireless linked computer being enabled for use with the inventive multimedia network via wireless components incorporated in a standard PCI or expansion module. In accordance with this aspect of the invention, the receiving and transmitting rf circuitry is connected to a notebook computer via the expansion bay provisions of the computer. The received video data is provided to the notebook computer and can be displayed (via software control) either full screen or within a window. A CCD camera, or the output of the notebook video circuit can be converted to an rf signal for transmission to devices connected with the multimedia network. A control signal generator is controlled in response to input from a user via a connection with the keyboard, communication port, mouse-type input device, etc. via the connection with the computer's expansion bay.

Figure 3(q) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wireless display terminal, the wireless display terminal being enabled with a wireless transmitter and receiver for use with the inventive multimedia network and for use with other similarly configured wireless display terminals. Thus, the inventive wireless display terminal can be used for displaying data transmitted from the multimedia network, and can be used for communication and data exchange (video, audio, binary, etc.) between similarly configured devices.

Figure 3(r) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wireless display terminal, the wireless display terminal being capable of sending video and audio back to the multimedia network and to other similarly configured wireless display terminals.

Figure 3(s) illustrates a configuration of the inventive multimedia network having a wireless connection between the computer node and a wireless display; the wireless display terminal being comprised of relatively low cost components.

Figure 3(t) illustrates a configuration of an embodiment of a touch screen wireless remote control device for displaying a same image on the remote control device screen as is shown on a large display connected with the inventive multimedia network.

Figure 4(a) is a flowchart showing the basic method for recording content-indicating information on a VCR tape in accordance with the present invention.

Figure 4(b) is a flowchart showing the basic method for playing back content-indicating information recorded on a VCR tape in accordance with the present invention.

Figure 4(c) is a flowchart showing the basic method for recording content-indicating information on a DVD or other random access recorder in accordance with the present invention.

Figure 4(d) is a flowchart showing the basic method for playing back content-indicating information recorded on a DVD or other random access recorder in accordance with the present invention.

Figure 4(e) illustrates a random access disk recording media having program content, a program content indicating document, and program content and document address index signal recorded thereon in accordance with the present invention.

Figure 4(f) is a flow chart showing the steps for controlling remote devices using the inventive wireless terminal via a remote computer in accordance with the present invention.

Figure 4(g) is a flow chart showing the steps for choosing the display selection for the inventive wireless terminal.

Figure 5 is a block diagram illustrating a configuration of the inventive multimedia network configured as stand-alone accessory boxed distributed on network through direct and wireless connections. The user input can be through keyboard/mouse, voice recognition or remote control. The connection for transmitting and receiving the information signal can be through the USB, ADB, serial, telephony, modem, game, parallel, data port, video port, etc., incorporated with a conventional personal computer. The VCR tape header information and data signal can be an inaudible signal that can be recorded on the VCR tape and detected using a software-based frequency filter or an electronic circuit-based frequency filter. The wireless transceiver 32 can be replaced with a hard-wired co-ax, home network system - like firewire, via existing phone lines or electrical wiring, etc. An FM circuit can be used, like that used by wireless mics and instrument pickups.

Figure 6 is a block diagram showing the use of microphone and speaker ports of a computer or video device for transferring signals for recording and receiving VCR tape content information over the inventive multimedia network.

Figure 7 is a block diagram showing the inventive multimedia network configured as an add-on part for a computer and imbedded VCR system;

Figure 8 is a block diagram showing the inventive multimedia network distributed over an existing home phone line network for transferring video, audio and/or computer data as a digital and/or analog signal.

Figure 9 is a block diagram showing the inventive multimedia network distributed over an existing home coaxial cable television network for transferring video, audio and/or computer data as a digital and/or analog signal.

Figure 10 is a block diagram showing the inventive multimedia network distributed over the existing home electrical wiring network for transferring video, audio and/or computer data as a digital and/or analog signal.

Figure 11 is a block diagram illustrating the capabilities of a single computer-enabled set top box being available at any TV on the inventive multimedia network.

Figure 12 shows the details of a distributed computer-enabled set top box capabilities distributed over the inventive multimedia network.

Figure 13 is a block diagram showing a basic configuration of an inventive addressable multimedia network.

Figure 14(a) is a schematic representation of a VCR tape recorded in accordance with the inventive method for indicating the content recorded on a videotape. Figure 14(b) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the tape having room for piggyback data. Figure 14(c) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording inaudible tone signals used as recorded control cue information recorded throughout the tape or at specific locations in accordance with the present invention. Figure 14(d) is a drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording tape identifying information and location on tape identifying information throughout the tape or at specific locations in accordance with the present invention. Figure 14(e) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording tape identifying information and/or location on tape identifying information and/or commercial skip data throughout the tape and/or at specific locations in accordance with the present invention;

In accordance with this aspect of the present invention, a method and apparatus are provided for controlling a video recorder through control signals generated by a remote computer. The content-indicating information corresponding to content to be recorded on a videotape is determined as described herein. The determined content-indicating information in a tape database on a computer memory, such as a hard drive, or on a memory device associated with a dedicated microprocessor 22. A tape

identification value for the videotape is determined. The tape identification value may be a user-inputted value or a computer or microprocessor 22 generated value, or a value received from another source such as an Internet or electronic programming guide. If an identification value is detected on a tape, then there is no need to determine a new value for it (unless the tape is to be reformatted or there is some other reason to change its identification value. The tape identification value is stored in the tape database and used to match a tape inserted in a VCR connected with the inventive multimedia network with other data stored in the tape database.

A recordable identification signal is generated by the computer or a microprocessor 22 for recording on the videotape. The recordable identification signal corresponds to the tape identification value and is transferred through connects of the computer and the remotely located VCR to the multimedia network. The recordable identification signal is transferred over the network to a recording head of a videotape recorder and the videotape recorder is controlled by control signals generated by the computer or a microprocessor 22 to record the tape identification signal on the videotape in the VCR. The tape identification signal can recorded substantially continuously during the recording of the content signal on the videotape. It can be, for example, an inaudible tone signal or other recordable data that does not substantially interfere with the viewer's viewing and listening to a TV program or other content recorded on the videotape. The tape identification signal can be recorded non-continuously during the recording of the content signal on the videotape, for example, as part of a tape information header recorded at the beginning of the tape.

During use, a content signal (such as a TV program) containing content to be recorded on the videotape is received. The content signal is mixed with the tape identification signal and transferred as a mixed signal to the recording head of the videotape recorder. The appropriate control signals are generated by the computer or microprocessor 22 and transferred to the VCR (or other recording device, such as a DVD player or digital VCR) for controlling it to record the content and tape identification mixed signal. Control cue information is determined for use in automatically controlling the videotape recorder (as described herein, or for other purposes). A recordable control cue signal corresponding to the control cue information is generated and mixed with the content and tape identification mixed signal. Or, the control cue information and/or the content and/or the tape identification signal (and/or the commercial break information described herein) can be generated separately or mixed depending on the intended functionality. The mixed control cue, content and tape identification signal is transferred to the recording head of the videotape recorder and the videotape recorder is controlled to record the control cue, content and tape identification mixed signal. At least one of the recordable control cue signal and the tape identification signal comprises a signal recordable on the videotape

that is not displayed during the normal playback of the tape. At least one of the recordable control cue signal and the tape identification signal comprises an inaudible tone signal. At least one of the recordable control cue information, the tape identification value and the content-indicating information can comprise HTML data.

The present invention provides and effective apparatus and method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database. Control cues corresponding to the generation of control signals under the control of a computer for control a remotely located video recorder are determined and stored in a tape database. To appropriate control the VCR via control signals generated by the remotely located computer or microprocessor 22, a generation time for generating a control signal corresponding with the control cue information for use in automatically controlling the videotape recorder can be determined. The generation time is determined by generating a tone signal during the recording of the videotape, the tone signal being an indication of the generation time for generating the control signal corresponding with the control cue information. The generation time can be determined as a time value occurring after a detection of the tone signal during the playback of the videotape. The time value corresponding to the generation time is stored in the tape database.

In accordance with the present invention, a video recorder is controlled through control signals generated by a remote computer for indicating the content recorded on a videotape. Control signals are generated using a computer for controlling a video recorder to playback a recordable identification signal previously recorded on a videotape. The recordable identification signal is transferred to the computer and a tape identification value determined (via software or a detection circuit) for the videotape. The tape identification value is compared with data stored in a tape database, or otherwise used to determine which tape is in the VCR. The content-indicating information stored in the tape data base corresponding to the tape identification value is thus found so that a representation of the content of television programs recorded on the videotape can be displayed by generating a graphical information screen, voice generation or other feedback that is generated by the computer or microprocessor 22 and displayed on the TV where the user is located (not necessarily where the VCR is).

Figure 14(b) is a schematic representation of a VCR tape recorded with short portions of the different television programs or home video recording segments recorded at the beginning of the tape for facilitating recorded content selection.

Figure 14(c) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the tape having room for piggyback data.

Figure 14(d) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording inaudible tone signals used as recorded control cue information recorded throughout the tape or at specific locations in accordance with the present invention.

Figure 14(e) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording tape identifying information and location on tape identifying information throughout the tape or at specific locations in accordance with the present invention.

Figure 14(f) is an drawing schematically illustrating data recorded on a conventional VCR tape, showing a portion of the tape being used to record audio and video information that is actually displayed on a television, and another portion of the taped being used for recording tape identifying information and/or location on tape identifying information and/or commercial skip data throughout the tape and/or at specific locations in accordance with the present invention.

Figure 15 is a schematic representation of the VCR tape shown in Figure 14.

Figure 16 is a schematic representation of the VCR tape shown in Figure 14.

Figure 17 is a flow chart showing a tape formatting operation in accordance with the inventive method for indicating the content recorded on a videotape.

Figure 18 is a flow chart of a pre-recording procedure in accordance with the inventive method for indicating the content recorded on a videotape.

Figure 19 is a flow chart of the tape recording procedure in accordance with the inventive method for indicating the content recorded on a videotape. The present invention can be used to correct Y2K problem of many VCRs which will not be able to be programmed after 12/31/99 (or some other date). If counter information is available, it can be used instead of tone signals to determined where the recorded portions begin and end. The end of the last recorded portion can also be found by detecting where there is no video signal recorded (in the case of a new unrecorded tape). The approximate location of tone signals are determined by calculating the FF (or RW) time to get to a known location on the tape.

The header, start, end, etc., signals are generated by the computer. They may be modem signals, or other tone signals. They do not have to be inaudible (they may be video data), and the volume of the TV can be muted via the remote control during times that these signals are being played back from the tape. In the case of video data, the pixel information can be used to carry binary information. For example, the pixel state, black or white, can be used to convey the binary number 1 and 0, respectively.

The binary data corresponding to the HTML document (or the content-indicating information) can be converted to pixel data representation and recorded as frames of video on the videotape. Upon playback, the frames of video data received from the videotape can be digitized by the computer to extract the binary data and thus reconstitute the HTML document or content-indicating information. The default could be to program the VCR to timer-record, which can be done through OSM or VCR+. The computer or microprocessor 22 can be used for timer recording for VCRs that are not in database, or for VCRs that are not Y2K compliant (after 12.31.99), or for any other reason that the VCR program record capability in not available or the logical choice. If the VCR programming function was used, then the computer or microprocessor 22 will have to record the End-Program signal at the next opportunity. Thus, there would need a mechanism to detect if the tape was removed or the end-of-program location moved from the recording spot, problem can be solved by finding end-of-program location or by detecting the end of recorded data on tape. The system can be self-contained in a VCR, without any computer connection. A small programmable microprocessor 22 would be used to generate and detect the head info and the program start and end info. A standard can be formed for licensing to VCR manufacturers so that their VCRs can read and write header and program information. In the case of a system with access to the tape counter (or other tape position determining means), more precise locations of the signals can be found, and- there might only be need for recording the header information since it will have the precise tape positions of the start and end of each program recorded on the tape.

Figure 20 is a flow chart showing the playback procedure of a selected pre-recorded program in accordance with the inventive method of indicating the content recorded on a videotape.

Figure 21 is a block diagram showing an example configuration of the inventive multimedia network containing multi-purpose nodes distributed over a pre-existing coaxial cable television network.

Figure 22 is a continuation of the example multimedia network shown in Figure 21.

Figure 23 is a continuation of the example multimedia network shown in Figure 21.

Figure 24 is a continuation of the example multimedia network shown in Figure 21. A selectable frequency modulator or tuner can be used for tuning in the shows selected via the control signals, or a predetermined tuner (one of the VCRs or cable set top boxes) can be controlled to tune in the channels that are output on that sources in-house channel. Any device that is shown with a wireless connection can typically also be connected to the network directly.

Figure 25 is a perspective view of a wireless multimedia computer for use with the wireless distribution node of the inventive multimedia network shown in Figure 24. Figure 26 is a schematic side view showing parts of the wireless computer shown in Figure 24. In accordance with an embodiment of this invention, the wireless multimedia computer includes a detachable wireless display terminal. When used within range of a wireless transceiver 32 node connected with the inventive multimedia network, the display terminal can be detached from the keyboard, computer and storage 24 device portion and act as a wireless display terminal as described with reference to Figures 27 and 28.

Figure 27(a) is a front view of a wireless display terminal for use with the wireless distribution node of the inventive multimedia network shown in Figure 24. As with the other wireless display devices and computers described herein, the wireless display terminal receives data signals through an antenna that is distributed on the inventive multimedia network. In the case of the wireless display terminal shown in Figure 27, a touch screen can be used to input user commands. Alternatively, another input device can also be used such as track pads and voice recognition. In the case of voice recognition, components can be incorporated along the lines of the remote controller with a built in microphone described herein.

Figure 27(b) is a perspective view of the wireless display terminal for use with the wireless distribution node of the inventive multimedia network shown in Figure 24. The wireless display terminal may include a directional or patch antenna that fits within or is fixed to a housing that receives and transmits data between the wireless display terminal and the other devices, such as the computer, on the network. The housing holds an LCD screen (which may have a touch screen associated with it). The computational power of the remotely located computer is controllable by the wireless distributed network terminal, and the wireless display terminal acts as a monitor for the computer. Thus, there is no need to include much, if any, computing power onboard the wireless distributed network terminal. The wireless display terminal also does not require much, if any, storage 24 capacity, since the computer hard drive and other storage 24 devices connected to the network can be accessed. Accordingly, the inventive wireless display terminal can be built for relatively low cost, have relatively low weight and have relatively low power requirements as compared with a conventional lap top computer.

The inventive wireless display terminal system is for use with a multimedia network that has a wireless transceiver 32 node for receiving and transmitting control signals and video data to wireless devices. The inventive multimedia network is an example of such as network, but is not the only such network that can be utilized with the inventive wireless display terminal system. The display terminal device includes a housing member and a display screen held by the housing member. Computer control

signal generating means 15 generates computer control signals for controlling a remotely located computer. A display driver drives the display screen in response to a display signal generated by the remotely located computer. A terminal side wireless transceiver 32 is disposed within the housing member ad transmits the computer control signals to the remotely located computer as a wireless signal. The terminal side wireless transceiver 32 also receives the display signal generated by the remotely located computer as a wireless signal. By this construction, a light weight, low power and relatively lower cost easily portable device is obtained that has most if not all the capabilities of the bulky and non-portable remotely located desktop computer. Further, the inventive wireless display terminal can be configured with some or all of the components described herein for the device and computer nodes, and thus provides a very flexible display and control system for viewing video and computer data generated by any of the devices and computers connected to the inventive multimedia network.

The signal generated by the remotely located computer includes computer display video data. Wireless video receiving means receives a wireless video signal containing the computer display video data generated by the remotely located computer. A Touch sensitive input device 80 can be built into the inventive wireless display terminal for receiving user input for controlling the generating of the computer control signals. The Touch sensitive input device 80 may be at least one of a touch screen disposed adjacent to the display screen, a pressure sensitive keyboard, a track pad and a track ball. Further, a voice recognition system, as described herein, can be employed for controlling the remotely located computer and the other devices connected to the network via user voice commands.

Depending on the configuration of the inventive network, or network and device connections that are anticipated, the terminal side wireless transceiver 32 can be constructed of at least one transmitter and one receiver comprised of an infrared transmitter, an infrared receiver, an ultrasonic transmitter, an ultrasonic receiver, a rf transmitter and an rf receiver. Thus, the terminal side wireless transceiver 32 can tune in or transmit two or more simultaneous channels. These channels can be processed by a video processor into a signal display image. Thus, for example, a multimedia signal, from a device node, can be combined with a computer monitor image (from a computer node) into a PIP-type image screen. The wireless display terminal may also include addressable identification means and any of the local channel selection means described herein. A wireless transceiver 32 node connected to a hard wired network having a connection to the remotely located computer can be provided. The wireless transceiver 32 node includes a computer control signal receiver for receiving the wireless signal including the computer control signals from the terminal side wireless transceiver 32 and a display signal transmitter for transmitting the display signal generated by the remotely located computer to the terminal side wireless transceiver 32. Further the

wireless transceiver 32 node can include the channel selection means for tuning in the local television and audio channels as described herein. An input device, such as a CCD camera and/or microphone, can be included to generate a video signal and an audio signal. The terminal display side wireless transceiver 32 includes means for transmitting the video signal and audio signal to the wireless transceiver 32 node as a wireless signal. Thus, the portable wireless display terminal can be used as a communication port for the in-home video intercom system, Internet-based video phone system, multi-purpose remote controller and enhanced speaker phone system described herein. The wireless transceiver 32 node can also be connected directly to the computer, without any need for a home hard wired network.

The inventive wireless display terminal can also include remote control signal generating means for generating remote control signals effective for controlling appliances receptive of such control signals. In this case, the appliances can include video and audio devices connected to the network, or other appliances, such as coffee makers, dishwashers, etc., can be controlled. For example, the remote control signal generating means might include a universal IR remote controller. The inventive wireless display terminal can be connected to a keyboard and CPU unit (like the one shown in Figures 25 and 26) to act as a display terminal for a portable notebook computer.

Figure 28(a) is an isolated view of a touch screen user input device 18 and LCD display screen, with a block diagram showing the components of an embodiment of the inventive wireless display terminal;

Figure 28(b) is a front view of an embodiment of the inventive wireless display terminal having an attachable touch screen/display unit that can be attached to a self-contained wireless computer as shown in Figure 26, with a wireless component unit attached to the touch screen/display unit;

Figure 28(c) is a front view of the wireless display terminal shown in Figure 28(b) having the wireless component unit being detached;

Figure 28(d) shows an embodiment of the inventive wireless display terminal mounted on a keyboard stand;

Figure 28(e) shows the wireless display terminal being detached from the keyboard stand;

Figure 28(f) shows the wireless display terminal having the keyboard stand being placed in a stowed position;

Figure 28(g) shows the wireless display terminal having the keyboard stand disposed in the stowed position behind the display screen;

Figure 28(h) shows the wireless display terminal having the keyboard stand disposed in a protective position in front of the display screen;

Figures 28(i) and 28(j) show the inventive antenna assembly 300 mounted for use with a laptop computer system or the inventive wireless terminal. In this case, the laptop computer or wireless terminal includes the radio signal transmitting device 302, which may be used to communicate with a remote computer located on the inventive multimedia network, and/or may be used in conjunction with a wireless modem or telephone for communication via the internet, satellite or land-based communications network. The laptop computer includes a communication circuit having a signal generator that is electrically coupled with the driven antenna member 304 of the inventive antenna assembly 300. The thus configured laptop computer can be used for wireless communication via, for example, a terrestrial cellular telephone network or orbiting satellite. The communication circuit may include a modem for the transmission of digital data over the inventive multimedia network, the internet or other communications networks. A local channel generator can be used to generate a local channel originating from the wireless terminal and transmitted via the communication circuit. During use of the wireless terminal, the user positions the top half containing a display screen 336 and the inventive antenna assembly 300 in an upright position. In this position, when the user views the display screen 336, the shielding side 308 of the inventive antenna assembly 300 is disposed so that the radio signal transmitted from the inventive antenna assembly 300 is directed away from the user and thus more effective for communication. The transmission side 306 of the inventive antenna assembly 300 is directed away from the user, so that the radio signal can be transmitted in directions away from the user. By providing the inventive antenna assembly 300 at the position on the upper portion of the laptop computer, the radio signal transmitted is not absorbed by the body of the user, and is directed away for effective communication with a remote receiver. A radiation transmissive window 338 may be provided for allowing the transmission and reception of radio signals by the inventive antenna assembly 300. Also, a separate reception antenna (not shown) may be provided to further enhance the communication characteristics of the inventive laptop computer capable of wireless communication.

Figures 28(k) and 28(l) show the inventive antenna assembly 300 mounted with a personal computing device known as a PDA. In this case, the inventive antenna assembly 300 is electrically coupled with the communication circuit of the PDA. For example, the communication circuit may include a modem for the transmission of binary data over, for example, the inventive multimedia network, a terrestrial cellular telephone network or orbiting satellite. The radio signal is transmitted through the transmission side 306 of the inventive antenna assembly 300 in directions away from the user for effective communication with a remote receiver. A radiation transmissive window 338 may be provided for allowing the transmission and reception of radio signals to and from the communication circuit of the PDA.

Figure 28(m) is an isolated enlarged cross sectional view of a flexible rechargeable battery 126 used in accordance with the present invention. The flexible rechargeable battery 126 is used, in accordance with the present invention, as a signal shielding battery 126 that includes at least one shielding material that is effective for electrically shielding electromagnetic signal. The signal shielding battery 126 is preferably a rechargeable plastic lithium-ion battery, such as that produced by Bellcore, of Livingston, NJ. Such a battery has an unfolded thickness that is about the same as the thickness of a credit card. The battery 126 comprises a plastic member 128, which is formed by impregnating a plastic with a liquid electrolyte. The resulting plastic electrolyte member 128 is typically about 50% liquid and cannot leak. The plastic electrolyte member 128 is sandwiched between a positive plastic electrode 130 melded to an aluminum mesh 132 and a negative plastic electrode 134 melded to a copper mesh 136. Thus, in accordance with the present invention, the signal shielding battery 126 comprises a negative planar electrode side (negative plastic electrode 134 and copper mesh 136) disposed at an electrically negative side of the battery 126, a positive planar electrode side (positive plastic electrode 130 and aluminum mesh 132) disposed at an electrically positive side of the battery 126, and an electrolyte member 128 disposed between the negative planer electrode side and the positive planar electrode side. At least one of the negative planar electrode side and the positive planar electrode side is comprised of the shielding material for electrically shielding electromagnetic, or microwave, signal. In accordance with the preferred embodiment of the invention, the negative planer electrode side comprises the shielding material. Preferably, an electronic component 138 that is to be shielded is grounded to the negative planer electrode side through an appropriate electrical connection, such as a ground wire 140 electrically connected between a connecting land 142 of the battery 126 and a connecting land 142 of the electrical component 138. To provide additional electromagnetic shielding, a signal absorbing layer 144 may be disposed as a laminate component of the signal shielding battery 126, as shown in Figure 28(m). Also, a signal blocking layer and/or reflecting layer (not shown) may be included in addition to, or substituted for, the signal absorbing layer 144. The signal blocking, reflecting and/or absorbing layer may include a magnetic shielding material, such as Mu metal, to enhance the signal shielding features of the invention.

Figure 28(n) is an isolated schematic view of a wireless terminal circuit board (electronic component 138) disposed adjacent to the flexible rechargeable battery 126. The signal absorbing layer 144 (and/or signal blocking layer, signal reflecting layer) may be disposed as a separate structure adjacent to a folded signal shielding battery 126, which may or may not include a laminate component signal absorbing layer 144. In accordance with the present invention, as shown in Figure 28(n), the signal shielding battery 126 comprises a thin laminar structure that can be cut, shaped and folded into

appropriate dimensions to fit within a case shell of the wireless terminal. By this construction, the signal shielding battery 126 functions both as a signal shielding member and as a rechargeable electrical power source. The obtainable voltage from the signal shielding battery 126 can be adjusted by electrically connecting two or more similarly constructed batteries.

An electronic component 138 is provided, such as the circuit components, internal antennae, keyboard, speaker, microphone, etc. of a wireless terminal. A signal shielding battery 126 is disposed adjacent to the electronic component 138. The battery 126 is comprised of at least one shielding material (such as the copper mesh 136 of the negative planer electrode side) which is effective for electronically shielding electromagnetic signals , thus reducing unwanted rf signal noise from emanating from or entering into the interior space of the wireless terminal case. As shown, the battery comprises a negative planer electrode disposed at an electrically negative side of the battery. A positive planer electrode is disposed at an electrically positive side of the battery, and an electrolyte member 128 is disposed between the negative planer electrode and the positive planer electrode. Preferably, at least one of the negative planer electrode and the positive planer electrode comprises a material which is effective to act as the shielding material for shielding an electrode magnetic signal. Thus, by this construction, an electromagnetic shield is provided for shielding the electronic component 138 of the wireless terminal from incoming electromagnetic wave signal (to reduce circuit noise), and for shielding electromagnetic wave signal emanating from the electronic component 138 (to prevent exposure of the user and external devices from the electromagnetic signal generated by the components of the wireless terminal). Preferably, as shown in Figure 28(n), the electronic component 138 is electrically grounded to the electrically negative side of the signal shielding battery 126. A circuit ground wire 140 may be soldered or otherwise fixed to the electronic component 138 (circuit board) and the copper mesh 136 of the signal shielding battery 126.

Figure 28(o) is a cut away perspective top view of a flexible rechargeable battery 126 and a case shell substrate 146 prior to assembly in accordance with a manufacturing aspect of the inventive method for shielding an electronic component 138. The flexible rechargeable battery 126 preferably has the structure described above with reference to Figures 23(a) and 23(b). The flexible rechargeable battery 126 is preferably fixed to a case shell substrate 146 using an adhesive 148. The adhesive 148 may have signal shielding, reflecting or blocking properties, and may be comprised of, for example, fine Ferro-magnetic particles dispersed within a rubber or epoxy adhesive medium. Prior to assembly, the flexible rechargeable battery 126 and the case shell substrate 146 are substantially flat sheet-like members, and thus can be easily shipped from a place of manufacture to a distant place of assembly. The case shell substrate 146 has notches 150 which facilitate folding of the case shell substrate 146. Two of the

edges of the case shell substrate 146 terminate in toothed engaging structures 152 which, as shown in Figure 28(p) mate together and become engaged to retain the case shell substrate 146 and the rechargeable battery 126 in a folded position. By this structure, a wireless terminal case member can be easily formed simply by folding the rechargeable battery 126 and case shell substrate 146 and engaging the toothed engaging structures 152. In accordance with the present invention, the wireless terminal case member is very easy and inexpensive to manufacture, while providing both electromagnetic shielding and a rechargeable battery power supply.

Figure 28(p) shows a cross-section top view of the inventive wireless terminal case member formed from the assembled flexible rechargeable battery 126 and case shell substrate 146 shown in Figure 28(o). As shown, once the flexible rechargeable battery 126 and case shell substrate 146 are folded, and the toothed engaging structures 152 are mated, a electrically shielded interior space 154 is defined within the formed wireless terminal case member. The electrically shielded interior space 154 is electromagnetic shielded to prevent a signal emanating from internally disposed electronic components 138 from reaching the external devices, and also preventing external electromagnetic signal from reaching the electrically shielded interior space 154 of the wireless terminal case member to prevent the unwanted introduction of circuit noise.

Figure 28(q) is a cross-sectional side view taken along line c-c of the assembled flexible rechargeable battery 126 and case shell substrate 146 shown in Figure 28(p). In Figure 28(q), the flexible rechargeable battery 126 has more folds, and thus is shown having more layers than are shown in Figures 24(a) and 24(b). The number of layers, and thus the length of the unfolded, unassembled flexible rechargeable battery 126 will depend on factors such as desired battery life, shielding capabilities, weight, and required interior space 154 of the assembled case shell substrate 146 member. In accordance with the inventive method for shielding an electronic circuit component, the rechargeable battery 126 is formed into a hollow shape defining an electrically shielded interior space 154. An electronic component 138 (wireless terminal circuitry) is disposed within the electrically shielded interior space 154. The interior space 154 defined by the battery is opened at its ends, and thus preferably these ends should be electrically shielded to prevent an electromagnetic signal from entering the electrically shielded interior space 154 and from exiting from the electrically shielded interior space 154. A shielding cap member 156 is fixed to the folded flexible battery to electronically close the open ends. The shielding cap members 156 may be fixed to the folded flexible battery 126 using either or both of a conductive adhesive 148 and a conductive tape (shown in Figure 26(b)).

In accordance with the present invention, the circuit components of a wireless terminal may be disposed within a electrically sealed folded flexible rechargeable battery

126 and electrically connected with the battery 126 to enhance the shielding aspects, and to provide a rechargeable power source for the wireless terminal circuitry. Appropriate electrode leads 160 may be provided from the wireless terminal circuitry, through the shielding cap member 156 and electronically connected with a jack 162 so that the electronic wireless terminal circuitry 138 shielded within the electrically shielded interior space 154 can be connected with components and peripheral equipment disposed outside of the electrically shielded interior space 154. In this case, the signal shielding battery 126 may be formed and sealed to create a hollow electrically shielded interior space 154 that is electrically sealed to prevent electromagnetic signal in the form of external noise from effecting the wireless terminal circuitry 138, while preventing an electromagnetic signal generated by the wireless terminal circuitry 138 from exiting the electrically shielded interior space 154. The thus formed flexible rechargeable battery 126 containing within a sealed electrically shielded interior space 154 the rf sensitive components of the wireless terminal circuitry 138 may simply be inserted within a case shell substrate 146 which includes the other necessary components for the effective use of the wireless terminal communication. In this case, the folded flexible rechargeable battery 126 and the wireless terminal circuitry 138 disposed within the electrically shielded interior space 154 comprise an easy to install modular unit which can be connected with the non-sensitive rf components of the wireless terminal (not shown) and electrically connected via the jack 162. By this construction, an easy to carry, compact unit is provided which includes a self-contained rechargeable power supply. The wireless terminal circuitry 138 is shielded against electronic noise, and is shielded from emitting harmful signal and/or electronic noise. The self-contained unit may include circuitry 138 containing personal data, such as a wireless terminal number, speed-dial numbers, voice recognition, call log, modem, fax, etc., and may be easily transported by the user and inserted in a variety of devices. For example, rental car companies may provide a terminal system which includes all of the necessary hardware except for that contained within the self-contained unit. A user then merely has to insert the personalized self-contained unit into the terminal hardware supplied with the rental car, to instantly obtain a customized wireless terminal communication device.

Figure 28(r) is an isolated enlarged cross-sectional view of an assembled and electrically sealed end of the case shell substrate 146 shown in Figure 28(q). The shielding cap member 156 is adhered to and fixed with the folded flexible rechargeable battery 126 through the use of an electrically conductive seal, such as an electrically conductive adhesive 148 or an electrically conductive tape. As shown, an electrically conductive adhesive 148 is used to completely seal off the electrically shielded interior space 154 so that an electromagnetic signal cannot enter or escape from the electrically shielded interior space 154. Also, the adhesive 148 or tape may comprise appropriate material, such as silicone, epoxy, etc. to provide a water tight seal thus waterproofing

the electrically shielded interior space 154. By this construction, a completely waterproof wireless terminal may be easily provided, as will be described in more detail below. In accordance with the present invention, the wireless terminal case member can be easily formed by fixing the flexible rechargeable battery 126 to the case shell substrate 146 so that the case member has at least a portion of at least one wall comprised of the case shell substrate 146 and the battery 126. By this construction, the overall size of the wireless terminal may be greatly reduced, since the interior portion of the wireless terminal includes a rechargeable power source that also functions as a shielding device and as part of the protective case structure. Thus, an external power pack, which is conventionally required, may be obviated. Also, the case shell substrate 146 may comprise a thin and flexible material, as opposed to the conventionally required thicker and usually brittle material, since the case member includes both the structural integrity of the case shell substrate 146 and the structural integrity of the flexible rechargeable battery 126. Therefore, in accordance with the present invention, a wireless terminal may be designed having excellent electromagnetic shielding capabilities to prevent unwanted noise and to prevent interference by an electromagnetic signal, while having a substantially reduced size and more durable construction as compared with the conventional art. Also, in accordance with the signal shielding battery construction described above with reference to Figure 28(m), through-holes may be easily formed in the battery to electrically connect the electronic components 138 disposed within the electrically shielded interior space 154 with exteriorly disposed components (i.e., external battery pack, antenna, other wireless terminal components, speaker, keyboard, etc.). Thus, in accordance with the present invention, a through-hole may be formed in the signal shielding battery 126, and a conductive wire 164 may be passed through the through-hole and electrically connected with the electronic circuit component 138 (as shown in Figure 25(b)).

Referring to Figures 28(s) and 28(t), in accordance with one aspect of the present invention, an antenna assembly 300 is provided for use with a radio signal transmitting device 302. The radio signal transmitting device 302 may be, for example, a cellular telephone, walkie-talkie, personal digital assistant ("PDA"), wireless terminal, computer equipped with wireless communications equipment, mobile fax machine, transmitter/receiver unit of a personal communication service (PCS) system, or other radio signal transmitter and/or receiver. The inventive antenna assembly 300 includes a driven antenna member 304 for transmitting a radio signal from the radio signal transmitting device 302 to a remote receiver, such as a terrestrial cell site, satellite, PCS server, or the like, or to . The radio signal is transmitted outward from a transmission side 306 of the antenna assembly 300, and is blocked from transmission through a shielding side 308 of the antenna assembly 300. To block the transmission of the radio signal, and thus prevent unwanted exposure of the user of the radio signal transmitting

device 302, radiation absorbing means 310 is disposed at the shielding side 308. During use of the radio signal transmitting device 302, the radiation absorbing means 310 is disposed between the driven antenna member 304 and the user.

In accordance with the inventive antenna assembly 300, a first parasitic element 312 (reflector) is disposed during use between the driven antenna member 304 and the user. A second parasitic element 314 (director) is disposed at the transmission side 306 of the antenna assembly 300. The second parasitic element 314 is disposed during use so that the driven antenna member 304 is between the second parasitic element 314 and the user. A significant increase in the power of the signal transmitted outward and away from the user through the transmission side 306 of the antenna assembly 300 is attained, as compared with a typical conventional antenna assembly 300. This increase in forward signal power attains a substantial increase in the range of the inventive antenna assembly 300, as compared with an antenna having a conventional antenna construction. The radio signal emitted from a conventional antenna propagates outwardly in a substantially uniform circular pattern centered on the antenna.

In accordance with the inventive antenna assembly 300, the first and the second parasitic elements 312,314 are disposed from the driven antenna member 304 at a gap distance that is effective to direct a portion of the radio signal toward the transmission side 306 of the antenna assembly 300. The parasitic elements 312,314 act as radio signal reflectors and directors. A dielectric member 316 is disposed in the gap between the first parasitic element 312 and the driven antenna member 304, and in the gap between the driven antenna member 304 and the second parasitic element 314.

In accordance with the one embodiment of the inventive antenna assembly 300, the dielectric member 316 may have a high dielectric constant. The dielectric member 316 provides support for the parasitic elements 312,314 and the driven antenna member 304, and also reduces the necessary gap distance between the driven antenna member 304 and the parasitic elements 312,314. The reduction of the gap distance is dependent on the dielectric constant of the dielectric member 316. It is well known that the rate of propagation of a radio signal through a medium is dependent on the dielectric constant of the medium. By providing a dielectric member 316 having a relatively high dielectric constant in the path of the radio signal propagating between the parasitic elements 312,314 and the driven antenna, applicants have found that the overall size of the antenna assembly 300 can be reduced. The dielectric member may be comprised of a ceramic, polymer, or other suitable material, such as a ceramic doped with godolinium, aluminum, calcium, vanadium, holmerium.

In accordance with the preferred embodiment of the inventive antenna assembly 300, the driven antenna member 304 has an effective antenna length that is substantially one half of the wave length of the radio signal transmitted by the radio signal transmitting device 302. In a preferred embodiment, the driven antenna member 304 is

comprised of two antenna segments, each having an effective antenna length equal to one quarter of the wave length of the radio signal. The two antenna segments are driven so as to form a dipole driven antenna member 304.

The first parasitic element 312 and the second parasitic element 314 preferably each have a length that is about one half of the wave length of the radio signal transmitted by the radio signal transmitting device 302. Also, the dielectric member 316 has a thickness and a dielectric constant effective to approximate the gap distance as being an air space gap distance of 1/10th of the wave length of the radio signal transmitted by the radio signal transmitting device 302. This gap distance has been experimentally proven to enable the range extending capabilities of the inventive antenna assembly 300.

The dielectric member 316 may be formed from a ceramic, polymer, or other suitable dielectric material. Also, in accordance with the preferred embodiment, the radiation absorber comprises a conductive material dispersed in a non-conductive matrix. The conductive material preferably includes at least one of a conductive free metal, FeO_2, titanium oxide, a ferromagnetic material, carbonyl iron, ferrite oxide, garnet, magnesium, nickel, lithium, yttrium, calcium, vanadium and iron-loaded urethane, neoprene or nitride.

Furthermore, in accordance with the preferred embodiment of the inventive antenna assembly 300, the radiation absorbing means 310 includes a first radiation absorber portion 320 that is disposed between the driven antenna member 304 and the metal shell member 318. A second radiation absorber portion 322 is disposed during use of the radio transmitting device adjacent to the metal shell member 318. Further, in accordance with the preferred embodiment of the inventive antenna assembly 300, a dielectric support material 324 is disposed to hold the components of the antenna assembly 300 at fixed relative positions, and to maintain the overall integrity of the antenna assembly 300. Preferably, the dielectric support material 324 has a low dielectric constant, and acts as a filler and support mechanism. The dielectric support material 324 may comprise a foamed polymer, such as polyethylene, polystyrene, Styrofoam, rubber, or the like.

The directional antenna described herein is useful for communicating with the inventive multimedia network via a radio transmitting device for transmitting the video data that is displayed on the wireless display terminal and the computer control signals originating from the wireless display terminal. The directional antenna can also be used be used to transmitting wireless modem and telephone data from a radio transmitting device such as a cellular telephone circuit and/or wireless modem. The directional antenna includes a first dielectric segment 326. The first dielectric segment 326 is configured and dimensioned so that during use of the radio signal transmitting device 302, the path of at least a portion of the radio signal propagating between the driven

antenna member 304 and the first parasitic element 312 passes through the first dielectric segment 326. The driven antenna member 304 is formed by depositing a thin film of conductive material on the surface of a side of the first dielectric segment 326. This thin film driven antenna member 330 may be formed by vacuum depositing, sputtering, print screening, spray coating or other known technique. The conductive material may be a conductive polymer, metal, or the like, such as aluminum, gold, copper or silver. The conductive material may be formed by thick film deposition on a substrate, such as the dielectric segment 14, and then selectively etching the thick film. The thin film driven antenna member 330 is electrically coupled to the communication circuit of the radio signal transmitting device 302. Thus, a signal generated by the communication circuit is transmitted through the use of the thin film driven antenna member 330. A thin film first parasitic element 332 is formed by depositing a conductive thin film on the opposing face of the first dielectric segment 326. Next, a second dielectric segment 328 is provided. A thin film second parasitic element 334 is formed by depositing a conductive material on the appropriate face of the second dielectric segment 328. The first dielectric segment 326 and the second dielectric segment 328 are then brought adjacent to one another and fixed with adhesive so that the thin film driven antenna member 330 is disposed between both the thin film first parasitic element 332 and the thin film second parasitic element 334. Thus, the first dielectric segment 326 having a high dielectric constant is disposed in the path of a portion of the radio signal propagated between the thin film first parasitic element 332 and the thin film driven antenna member 330. Similarly, the second dielectric segment 328 having a high dielectric constant is disposed in the path of a portion of the radio signal propagated between the thin film second parasitic element 334 and the thin film driven antenna member 330.

The components of the shielding side 308 of the inventive antenna assembly 300 may be formed by first bending the metal shell member 318 into an appropriate shape, having an appropriate curvature as shown in Figure 28(s). The relatively thin radiation absorber portion 12 is fixed adjacent to the backside of the metal shell member 318, and then the relatively thick radiation absorber portion 11 is fixed adjacent to the front side of the metal shell member 318. These components are then brought adjacent to the first dielectric segment 326. The low dielectric support material 324 is filled in place so as to bind the various components of the inventive antenna assembly 300 together, and to maintain the integrity of the thus formed system.

Figure 29 is a schematic perspective view of a bracelet personal locator for use with the wireless distribution node of the inventive multimedia network shown in Figure 24. The personal locators include a wireless signal transmitter that sends an identification signal to a device, such as a computer or microprocessor 22, to enable the location of a person to be determined. In this case, if, for example, a phone call comes

in for the person, the programs or other content on video and audio devices located nearby can be muted and the devices used to allow communication between the person and the caller in the manners described herein.

Figure 30 is a schematic perspective view of a badge-type personal locator for use with the inventive multimedia network shown in Figure 24.

Figure 31 is a perspective view of a hand-held personal digital assistant for use with the wireless distribution node of the inventive multimedia network in Figure 24.

Figure 32 is a graphic illustration of an addressable unit pulse train and device control signal pulse train.

Figure 33 is a block diagram showing a configuration of an addressable multimedia network having a single local channel generator at each node.

Figure 33 is a block diagram of another configuration of the inventive addressable multimedia network.

Figure 34 is a block diagram showing a configuration of the inventive addressable multimedia network having multiple computer nodes and video device nodes distributed on the network.

Figure 35 is a block diagram showing another configuration of the inventive addressable multimedia network having a node with a double local channel generator.

Figure 36 is a block diagram showing another configuration of the inventive addressable multimedia network having a three channel high-definition location channel generator.

Figure 37 is a block diagram showing another configuration of the inventive addressable multimedia network having a computer node and a computer signal device node.

Figure 38 is a block diagram showing a example prototype configuration of the inventive multimedia network.

Figure 39 shows some of the windows of the Multimedia Network prototype FaceSpan project.

Figure 40 shows some more of the windows of the Multimedia Network prototype FaceSpan project.

Figure 41(a) is a schematic diagram of a remote control signal playback circuit module and a remote control signal capture circuit module. The modules connect with a computer (or other remote control signal generator/detector) and the inventive multimedia network to enable the computer to capture and learn the remote control signals remotely generated by an IR generating remote control unit at a device node or at the computer node. These modules allow the computer to "learn" the various remote control codes needed to generate device control signals for controlling devices located remotely on the inventive multimedia network. Figure 41(b) is a schematic diagram of an IR remote control signal playback circuit module and an IR remote control signal

capture circuit module for connecting with a computer (or other remote control signal generator/detector) and the inventive multimedia network to enable the computer to capture and learn the remote control signals remotely generated by an IR generating remote control unit at a device node, and to allow the computer to generate device control signals for controlling devices located remotely on the inventive multimedia network. Figure 41(c) is a schematic diagram of an IR detector and emitter unit for use at a device node to be connected via the multimedia network with the IR circuit modules shown in Figures 41(a) and (b) located at a computer node or other remote control signal generating node.

The control signal that is captured and that is generated can be an electrical (i.e., DC pulse), rf, or IR signal. In the case of the electrical and rf signal, the network (such as the phone, coaxial and/or electrical wiring) that the computer node is connected with can be used to transfer the control signals between the computer node and the various device nodes. Further, the rf signal can be transmitted wirelessly to a matching receiver located at the device nodes. The control signals that are received from the devices on the network can be applied as pulse values, voltage values, AC or DC frequency values, current values, etc. The control signals can be converted (if necessary) to an appropriate signal that can be received by one or more of the inputs available for the computer. For example, if the control signal consists of a tone or audio frequency that is recorded on a videotape (as described herein), then the computer can receive the control signal as a signal modulated by a local carrier frequency and inputted through a TV tuner that is internally or externally connected to the computer. The tone frequency control signal is detected by tuning in the local carrier frequency and demodulating the audio signal portion. The computer can then detect the tone signal via software that receives the audio signal and decodes it to detect the particular tone frequency. In the case of DC pulse data control signals, an example of a connection with the computer for detecting such control signals is shown in Figure 41(a). In this case, the "paper empty" pin of the computer's printer port is used to receive the pulse data. The simple circuits shown in Figure 41(a) and 41(b) were modified from circuits that are discussed in an Internet web site (http://www.ee.washington.edu/eeca /circuits/PCIR/Welcome.html) where more information on these circuits can be found.

The computer receives the control signals from the network and detects various control and device status information. In some cases, it may be advantageous to have a stand-alone detector provided. For example, the device status detector shown in Figure 3(m) can be a simple Light detector 76 located at the device node near the TV screen. When the TV is on, the Light detector 76 outputs an "on" value that results in the computer remote control signal generator sending a specific "device on" control signal to the computer. As with the remote control signals that are used for controlling the computer, this "device on" signal may be accompanied by a "handshake" signal that lets

the computer know which TV of all the connected TVs is the one that is being detected as being on. In this case, the device status detector can be accomplished via software running on the computer that receives the "device on" control signal and reacts appropriately. The centralized computer can send a polling signal to each of the device nodes and addressable devices requesting the status of the devices connected to the network. The status may include the device's on/off state, current tuner frequency, volume level, etc. If user sensor means are provided, the status may also include the location and identification of users.

Figure 42(a) shows a display device screen, such as a television, receiving video data generated by the remotely located computer indicating the initialization of a video intercom call. Figure 42(b) shows a display device screen, such as a television, receiving video data generated by the remotely located computer showing a video intercom call in process. Figure 42(c) shows a display device screen, such as a television, receiving video data generated by the remotely located computer showing the zooming in of the caller's image during a video intercom call.

Figure 43 is a flowchart showing the operation of a video intercom conversation in accordance with the present invention.

Figure 44(a) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a horizontal split screen with an internet web page and a television program. Figure 44(b) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a picture-in-a-picture (PIP) split screen with an internet web page and a television program. Figure 44(c) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a vertical split screen with an internet web page and a television program.

Figure 45(a) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a PIP split screen with a first television program shown full screen and a second television program shown in PIP format. Figure 45(b) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a PIP split screen with a first television program shown with it screen size altered to fit within one-half the display area and a second and a third television program shown in PIP format. Figure 45(c) shows a display screen, such as a television, receiving video data generated by the remotely located computer showing a horizontal split screen with a first television program resized to fit within the top half the display area and a second television program resized to fit within the bottom half the display area.

The flowcharts shown in Figures 46 through 59 illustrate some of the features and product enhancements that are attainable in accordance with the operation of the inventive multimedia network. The control of remotely located devices is enabled

through the use of a remote control signal generator under the control of a computer or dedicated microprocessor 22. In particular in the case of a computer, the computer can be located remotely from the devices that it is controlling (and/or remotely from the remote control signal generator), with the inventive multimedia network being used to transfer control signals and data between the computer and the device it is controlling. Through the use of the present invention, a number of the pre-existing video and audio devices become "smart" device that get the advantages of the computational ability and software flexibility of a powerful computer CPU.

Figure 46 is a flowchart showing the operation of a computer controlled via software to enable a remotely located device to record a radio program with a content-indicating information signal.

Figure 47 is a flowchart showing the operation of a computer controlled via software to enable a remotely located VCR to obtain a commercial skip VCR recording feature in accordance with the present invention.

Figure 48 is a flowchart showing the operation of a computer controlled via software to enable a remotely located VCR to obtain another version of the commercial skip VCR recording feature in accordance with the present invention.

Figure 49 is a flowchart showing the operation of a computer controlled via software to enable a remotely located VCR to playback a recorded program with the commercial skip feature in accordance with the present invention.

Figure 50 is a flowchart showing the operation of a computer controlled via software to enable TV viewing autopilot features in accordance with the present invention.

Figure 51 is a flowchart showing the operation of a computer controlled via software to enable a commercial rebound feature in accordance with the present invention.

Figure 52 is a flowchart showing the operation of a computer controlled via software to enable parental control features in accordance with the present invention

Figure 53 is a flowchart showing the operation of a computer controlled via software to enable additional parental control features in accordance with the present invention.

Figure 54 is a flowchart showing the operation of a computer controlled via software to enable a voice-activated child monitor feature in accordance with the present invention.

Figure 55 is a flowchart showing the operation of a computer controlled via software to enable a security alert feature in accordance with the present invention.

Figure 56 is a flowchart showing the operation of a computer controlled via software to enable scheduling features in accordance with the present invention.

Figure 57 is a flowchart showing the operation of a computer controlled via software to enable a home reference system feature in accordance with the present invention.

Figure 58 is a flowchart showing the operation of a computer controlled via software to enable an Internet-based alert feature in accordance with the present invention.

Figure 59 is a flowchart showing the operation of a computer controlled via software to enable an email alert feature in accordance with the present invention.

Figure 60(a) is a flowchart showing the operation of a computer controlled via software to enable duplication of a video or other recorded information by remotely controlling two or more devices connected with the inventive multimedia network.

Figure 60(b) shows a configuration of a set top box for use with the inventive multimedia network. This multimedia network set top box may be a stand-alone accessory device, that works in conjunction with a cable set top box made available to subscribers of a cable television service provider or satellite broadcasting service. Alternatively, to avoid component redundancy, the components of the cable set top box video recorder, internet appliance, and/or the satellite set top box can be incorporated along with the components of the inventive multimedia network set top box and provided as part of the user's subscription cost (as is done with a typical cable or satellite service).

In accordance with this aspect of the invention, a network signal is received from a coaxial or other home network signal source. As described herein, this network signal source includes the TV channels that are allotted to the cable television channels. Since different cable television providers make use of different channels, the present invention includes local channels that are outside the frequency range allotted to television channels. Thus, the network signal source may include local channels that are outside the allotted television channels. To allow a user in one room to control a device (such as the present set top box) from another room, computer and device control signals are also included in the network signal source as described herein. To allow the CPU or the present set top box (or a microprocessor 22 or CPU of another computer or device connected to the network) to control appliances and devices remotely, the control signals included in the network signal include device control signals as described herein.

A Video PIP generator under the control of the CPU receives the local television channels as well as the television channels that are provided by the cable television provider. A number of tuners can be included to tune in two or more cable (or broadcast or satellite) television channels at once. The CPU controls a local channel selector that selectively connects the demodulated audio and video signals of the local channels from the local channel filters and feeds them to the PIP generator. The

demodulated audio and video signals can also be remodulted to, for example, channels 3 or 4 (or some other channel) for display on a conventional TV through a direct coaxial connection or via a connection with a VCR or other video device connected to the TV.

The output of the PIP generator, as well as other output from devices such as the VCR or DVD player, are received by local television channel generators, which in this embodiment each generate a television channel that is outside the allotted TV channels. It is to be noted that one or more of the local television channels can be carried by frequencies that are within those allocated to the television band, while others are outside the band. This will enable any TV, VCR, etc. to tune one or some of the local channels directly, while a set top box or other device that includes the local channel tuners for outside the band is needed to tune in others. As an example, the network set top box shown here can have the output of its PIP generator modulated to local TV channels 3 or 4 for display on a TV directly connected to the set top box, or connected through another device such as a VCR. And/or the PIP generator output can be modulated to a local channel that is within the range allotted to the TV band, but is unused by the cable provider or usually not viewed by the user. This local channel can be injected into the network source signal so that any TV or VCR or other video device can tune it in directly. At the same time, the video devices, such as VCRs, DVDs, etc. connected to the network can have their outputs modulated to the TV channels that are outside the allotted TV band. The output of these devices is displayed on remote TVs by tuning in the local channel of the remote set top box output (which is under the remote control of the user located where the remote TV is). By this configuration, only one local TV channel has to be "taken" from the allocated TV band, while still allowing any display connected to the network to display the output of any other device connected to the network (provided that the output of the other device is available for tuning in by the network set top box. To accommodate two or more simultaneous users of the output of the network set top box, two or more such set top boxes can be provided on the network (each individually addressed), or a single network set top box can be configured to be capable of creating separate PIP output that is modulated to separate local TV channels (along the lines of the multiple monitor outputs from a single computer as described herein).

Figure 60(c) shows an inventive wireless display terminal for use within range of a multimedia network identified on the network via addressable handshake exchange, and for use outside the range of the network for use as a stand-alone personal digital assistant, pager, cellular telephone, etc.

Figure 60(d) shows an inventive wireless display terminal in use for controlling devices connected with the multimedia network through control signals communicated via a central computer.

Figure 60(e) shows an inventive wireless display terminal connected with a central computer of an inventive multimedia network having multiple computer display local channels.

Figure 60(f) shows a variety of wireless display terminals connected and communicating with each other through control signals via a central computer;

Figure 60(g) shows a plurality of wireless display terminals in use in a class room setting.

Figure 60(h) shows a wireless display terminal connected with a multimedia network having the capability of displaying TV (NTSC) and high-definition (computer monitor, HDTV) display images.

Figure 60(i) illustrates a home multimedia network that connects with display, input and control devices throughout the home, and that communicates with a computer system located in a vehicle node when the vehicle is in the home garage.

Figure 60(j) illustrates a home multimedia network having content input received through Internet, satellite, cable television, phone line and the like at a central computer and distributed via bridge circuits throughout the home via coaxial cable, phone line and electrical wiring networks.

Figure 61 illustrates a child's toy having sensors and input mechanisms used for communicating with a remote computer via a wireless transmission and reception circuitry and display output and toy movement controlled in response to control signals originating from the computer. The inventive toy utilizes actuator wires made from a shape memory alloy (SMA). A SMA exploits a shape memory phenomenon that occurs in certain alloys, such as alloys in the nickel-titanium family. An example of an SMA actuator wire is manufactured by Dynalloy, Inc. of Irvine, CA and sold under the trademark Flexinol. When heated, the SMA actuator wires contract and can exert considerable pulling force as their length shortens. Upon cooling, the SMA actuator wires relax back to their original length. One way of heating the SMA actuator wires is to pass an electrical current through them. The inventive toy utilizes the contraction of the SMA actuator wires heated by a controlled current flow to actuate the mouth or appendages (or other moving parts) of the toy in response to control signals transmitted from the computer. The control signals may be generated by the computer in response to a sensed condition sensed by sensors onboard the toy (or externally disposed) and transmitted wireless to the computer.

The inventive toy includes sensing means for sensing a change of state of an internal or external condition. Transmitting means transmits a wireless signal in response to the change of state to a remotely located computer. The remotely located computer has toy signal receiving means for receiving the wireless signal transmitted from the toy. The transmitting means is effective for transmitting audio, video, switch, sensed data and computer control signals generated by the toy. The sensing means may comprise a

microphone for sensing a audio condition change of state; a CCD camera for sensing a video condition change of state; a pressure sensitive switch for sensing a pressure condition change of state; a light for sensing a light level condition change of state; a motion sensor for sensing a motion condition change of state; a infrared sensor for sensing an infrared signal condition change of state; comprises a thermal sensor for sensing a thermal condition change of state; and the like.

The inventive toy may further comprise computer generated signal receiving means for receiving a wirelessly transmitted computer-generated signal. The computer-generated signal may comprise at least one of a control signal, audio signal, video signal, and data signal. A speaker and/or video display may be included with the toy for receiving and displaying the computer-generated audio signal and video signal. The computer-generated audio and video signal may be transmitted on a local channel, and the toy may include tuning means for tuning in the local channel.

The computer can generate a device control signal for use in controlling external devices, such as televisions, VCRs, home automation device, set top boxes, DVD players and the like. The control of these devices may be via control signals generated by the computer in response to voice or pressure switch commands inputted from a user via the toy. The toy may be used to transmit the control signals to the device (or the control signals can be transferred through the network as described herein.) If the toy is to transmit the control signals to the device, Converting means 36 may be provided with the toy for converting the received device control signal into an infrared diode driving signal. An infrared transmitting diode receptive of the infrared diode driving signal emits an infrared signal effective for controlling the remotely located device. The toy may include a microprocessor 22 or other control circuit with the ability to generated the device control signals without communication with the external computer.

The receiving means may receive a wirelessly transmitted computer-generated toy control signal. This computer-generated toy control signal is generated by the computer in response to the change of state of an internal or external condition sensed by the toy and transmitted to the computer. Actuating means may be provided that is receptive of the computer-generated control signal for actuating a movable part of the toy. The actuating means may include a memory alloy element capable of undergoing a reversible change in shape in response to heating; a power control circuit for controlling the application of electrical power to heat the memory alloy element; and a power source. The actuating means further includes a thermal sensor for sensing the temperature of the memory alloy element. Thus, a relatively inexpensive toy can be enabled with the computational power of a powerful desktop computer.

At the computer end, toy interfacing means is associated with the computer system including computer display local channel generating means; computer generated toy and device control, audio, video and data signal transmitting means; toy generated audio,

video, switch and sensed data computer control signal receiving means. By sensing the conditions of the toy and transmitting this sensed data to the computer, a number of useful attributes can be enabled for the toy. For example, by sensing the tilt and motion of the toy the controlled movement via the actuating means can be accomplished under the control of the remotely located computer, enabling artificial intelligence or other software algorithms to effect attributes to the toy that would otherwise be too expensive, complicated or bulky to implement via on-board toy systems.

Figure 62(a) is a block diagram showing a bridge circuit for use with the inventive multimedia network for enabling simultaneous two-way audio, video, data and control signals generated by various devices connected to the network to transmit over hard wire networks such as coaxial, phone, electrical and data line as well as for the wireless transmission of such signals. In accordance with this aspect of the invention the bridge circuit includes Wireless signal transmitting means 86 for transmitting at least one of audio, video, data and control signals originating from devices connected via a hard-wired portion of a multimedia network to wireless devices. The wireless devices may include the inventive display terminal, a notebook computer having the inventive wireless expansion module installed, the inventive wireless personal digital assistant and the like.

Wireless signal receiving means receives at least one of audio, video, data and control signals originating from the wireless devices. Channel tuning means 90 tunes a channel comprising at least one of the audio and video signals originating from devices connected via a hard-wired portion of a multimedia network for transmission to the wireless device. The device connected via the hard-wired portion include VCRs, computers, DVD players, video recorders, set top boxes, satellite receives, home automation units, appliances. stereos, telephone systems, and the like.

Connecting means connects the hard-wired portion of the multimedia network to the wireless signal receiving means so that said at least one of audio, video, data and control signals originating from the wireless devices can be transmitted to and received by the devices connected via the hard-wired portion. The connecting means includes signal transmission lines, combiners/splitters, diode and diode-type circuits, filter circuits, amplifying circuits, signal conditioners and the like for making a suitable connection between and among devices connected on coaxial, phone line, electrical power line, and data line hard-wire networks, as well as wireless networks and devices.

The connecting means may also include amplifying means for amplifying at least one of said at least one audio, video, data and control signals originating from the wireless devices and/or from the hard-wired connected devices. The connecting means may further include impedance matching means for matching the impedance at least one of said at least one audio, video, data and control signals.

Incoming control signal detecting means 94 detects control signals received from the wireless devices. Controlling means controls channel tuning means 90 to tune in a channel available for transmission from the network depending on the detected control signal. Thus, the wireless device is capable of controlling which channel from a possibly large selection of cable, satellite, local device, local computer channels to tune in for transmission to the wireless device (alternatively, the wireless device can include the tuner onboard, and the signal transmitted to it from the network may include all or a portion of the available channels).

The inventive bridge circuit includes local channel generating means for generating a wireless device local channel comprising at least one of the audio and video signals received by the wireless signal receiving means from the wireless device. The local channel generating means may comprise modulating means for modulating said at least one of the audio and video signals by a carrier channel frequency tunable by at least one device connected to the network. The carrier frequency may be within the range allotted for television channels, or outside that range.

The wireless signal transmitting means 86 can include a microwave frequency transmitter for transmitting at least one microwave frequency audio, video, control and data signal originating from the wireless device. The frequency may be within the 900 MHz and 2.4 GHz bands available for local short distance communication.

Incoming control signal detecting means 94 detects control signals received from the wireless devices. The control signals can be generated by the wireless device to control the computer and other device connected to the network directly (such as through the use of a universal remote control signal generator or algorithm). Alternatively, the control signals can be directed only for controlling a centralized computer, and the centralized computer can generated device control signals for indirect control of devices connected to the network by signals originating from the wireless device. The controlling means may control the local channel generating means to generate the wireless device local channel depending on the detected control signal, or it may be indirectly controlled via the central computer.

The inventive bridge circuit may also include control or data signal detecting means for detecting a control or data signal originating from the devices connected via the hard-wired portion. The Wireless signal transmitting means 86 may include a wireless signal transmitter for receiving the detected control or data signal and converting it to a radio frequency control or data signal for transmission to the wireless device. The control signal or data signal detecting means may include means for converting a direct current control or data signal to an infrared control or data signal. The Wireless signal transmitting means 86 may include a wireless signal transmitter including an infrared-to-radio frequency converter for receiving the infrared signal from the control signal or data signal detecting means and converting it to a radio frequency for transmission to

the wireless device. The control or data signal detecting means may include means for converting a direct current control or data signal to a radio frequency control or data signal. The wireless signal transmitting means 86 may include a wireless signal transmitter for receiving the radio frequency control or data signal for transmission to the wireless device. The control signal or data signal detecting means may include filtering means for filtering a direct current control or data signal from other signals received from the hard-wired portion. The wireless signal transmitting means 86 may include a wireless signal transmitter for receiving the direct current control or data signal and converting it to a radio frequency control or data signal for transmission to the wireless device. The wireless signal receiving means may include a microwave frequency receiver for receiving at least one microwave frequency audio, video, control and data signal originating from the wireless device.

In accordance with the present invention, wireless devices can be connected via the bridge circuit that is hard-wire or wirelessly connected to another bridge circuit and wirelessly connected to another wireless device to connect the two wireless devices. All of the device control signals may originate from the computer, in response to computer control signals (e.g., user-inputted remote controls) or computer algorithms (e.g., scheduling, alerts), and thus the computer will be capable of determining the state (on, off, channel selection, volume, tape in, time left on tape, etc.) of the various devices.

Figure 62(b) shows an expansion module for use with a pre-existing notebook or desktop computer to enable simultaneous two-way way audio, video, data and control signals generated by various devices connected to the network with the pre-existing computer. The expansion module includes expansion module interfacing means for interfacing with a computer expansion port. Local channel radio frequency receiving means is in communication with the computer through the expansion module interfacing means. The local channel radio frequency receiving means receives a radio signal channel containing at least one of a video and audio signal originating from an external audio and/or video signal generating device. A user input interfacing means is provided for interfacing with a user input device 18 of the computer and generating a user input signal. For example, the keyboard or mouse input device of the notebook computer is interfaced with the inventive expansion module through the user input interfacing means. Control signal generating means generates control signals in response to the user input signal for controlling the generation of the at least one video and audio signal originating from the external audio and/or video signal generating device. Control signal radio frequency transmitting means wirelessly transmits the control signals to the external audio and/or video signal generating device.

The external audio and/or video signal generating device may comprise a second computer, such as a central computer connected to the network via the inventive bridge

circuit, having a wireless transmitter connected to at least one of a video and audio output of the external audio and/or video signal generating device for generating the radio signal channel. The external audio and/or video signal generating device may also be at least one of a video recorder, VCR, phone system, CCD camera, stereo, radio, CD player, set top box or DVD player having a wireless transmitter connected to at least one of a video and audio output of the external audio and/or video signal generating device for generating the radio signal channel.

A radio frequency transmitting means transmits at least one of a video and audio signal to the external audio and/or video signal generating device. The video and audio signal comprises the output of the computer connected to the expansion module. The expansion module interfaces with the computer via a single or combination of expansion ports, such as PCI slots, parallel and serial ports, monitor and video output ports, speaker and microphone ports, and the like.

Computer video signal connecting means 92 connects with a monitor video signal source of the computer. The radio frequency transmitting means may receive a monitor video signal of the computer for transmission to the external audio and/or video signal generating device. A CCD video signal Connecting means connects with a CCD video signal source associated with the computer. The radio frequency transmitting means may receive a CCD video signal for transmission to the external audio and/or video signal generating device. Switching means may be provided for switching between the output of the Computer video signal connecting means 92 and the CCD video signal Connecting means and generating a video source output. The radio frequency transmitting means the video source output of the Switching means for transmission to the external audio and/or video signal generating device.

Figure 62(c) shows a prototype configuration demonstrating the feasibility of the inventive bridge circuit and expansion module shown in Figures 62(a) and 62(b).

Figure 62(d) shows an alternative embodiment of the inventive expansion module including a removable video/audio/control signal transmitter. In accordance with this embodiment of the inventive expansion module, interfacing means is provided for interfacing with a computer expansion port. Local channel radio frequency receiving means in communication with the computer through the expansion module interfacing means receives a radio signal channel containing at least one of a video and audio signal originating from an external audio and/or video signal generating device. User input interfacing means interfaces with a user input device 18 of the computer and generating a user input signal. Control generating means generates control signals in response to the user input signal for controlling the generation of the at least one video and audio signal originating from the external audio and/or video signal generating device. Control signal radio frequency transmitting means wirelessly transmits the control signals to the external audio and/or video signal generating device.

A removable signal transmitter is provided including at least one of a CCD camera, microphone and control signal generator; an expansion module interface for removably connecting the removable signal transmitter with the expansion module. The removable signal transmitter may be used to control the external computer and device (directly or through the various network connections described herein), and may be used to control the computer connected with the inventive expansion module. The video and/or audio signal transmitted from the removable signal transmitter may be received and displayed by the devices connected to the network, and/or may be received and displayed by the computer connected with the expansion module.

Computer video signal connecting means 92 can be provided for connecting with a monitor video signal source of the computer. Switching means may be included for switching between the output of the Computer video signal connecting means 92 and the removable signal transmitter and generating a video source output.

Figure 63(a) illustrates an inventive home or office network configuration, comprising a home or office network module connected to at least one I/O port and a monitor port of a computer a second network module connected at a multimedia device (VCR).

Figure 63(b) is a block diagram illustrating a configuration of a multimedia device transceiver 32 network module and a computer transceiver 32 network module.

Figure 63(c) illustrates an inventive home or office network configuration having a wireless network communication with a wireless display terminal wireless display terminal via at least one antenna node device directional antenna coax faceplate.

Figure 63(d) is a block diagram illustrating a configuration of the home or office network with a wireless signal communication between the wireless display terminal and the computer transceiver 32 network module via the directional antenna coax faceplate.

Figure 63(e) illustrates the use of the inventive antenna node device directional antenna coax faceplate for creating a clear consistent wireless signal within a networked home or office. Directional antennas are located throughout the home, thus creating a multi-path for the signal and reducing the problems of sending and receiving antennas orientation and distance. The problems of multi-path cancellation nodes can be addressed by employing antenna diversity, that is, providing a pair of antenna members separated by an appropriate distance so that if one antenna is located in a cancellation node, the other is likely to not be located in a cancellation node.

Our goal is to create a controllable, high security, low emission, clear and consistent wireless signal zone anywhere desired within the office or home. Our focus is on network-enhancing devices we are calling antenna node devices 200. antenna node devices 200 are antenna nodes that connect with pre-existing wire networks and act as a bridge between wireless devices and the hardwire network.

The use of the pre-existing wire network creates an efficient and effective transmission path for connectivity between the antenna node devices 200 and devices connected to the coax. The use of wireless network components creates the opportunity for mobility and avoids the problems associated with installing new wires.

In the home environment, the antenna node devices 200 should be able to work wtih a typical pre-existing coax cable network. This will require the ability to convert a wireless 2.4 Ghz signal to 900 Mhz (or less) so that the signal will travel well through splitters on the network.

In the office environment, the antenna node devices 200 work with a typical Ethernet network, allowing a wireless Ethernet device to access the wired Ethernet.

Direct current power is injected onto the signal line (+) and the shielding (-) of the coax cable from an external source. DC filtering (capacitor) may be needed for the blocking interference with the audio/video and data signals carried on the coax.

The inventive system overcomes the problems of creating a computer and/or A/V network within a pre-existing home or office environment. The pre-existing wire network provides a great transmission path for networking devices, but usually terminals to this wire network are not conveniently available. Wireless networking systems avoid the terminal issue, but signal attenuation due to building materials and other factors limits the wireless network. Of course, one solution would be to simply boost the transmitted signal strength. However, this approach would create undesired security, interference and regulatory issues. Realizing that the installation of new wires is often not practical, the present invention provides a hybrid network solution that combines new wireless devices with pre-existing infrastructure, such as cable television (home) or Ethernet (office) wire networks. The inventive networking solution creates a controllable "zone of coverage" of wireless network signals, and at the same time makes the audio, video and data carried by these signals available by devices connected directly to the coax. For example, in the case of a coax network, antenna node devices 200 allow the coax to be used as a transmission medium to extend the range (and reduce the required transmission source power output) of the wireless signal.

The antenna node devices 200 will receive a 2.4 GHz signal originating from a wireless transmitting source, amplify and down convert the signal to 900 Mhz, and inject the 900 Mhz signal onto the coax network. The antenna node devices 200 will also receive a 900 Mhz signal from another antenna node device or a 900 Mhz transmitting source, amplify and up convert it to 2.4 GHz, and then transmit the 2.4Ghz signal to a wireless receiving device. The antenna node device is powered from a low voltage DC source injected onto the coax, with onboard controlling means to control the amplification level at each antenna node device so that only as much of a signal needs to be radiated as is required for clear reception by a particular receiving device.

Very often the home computer is not located near a terminal of this coax network. The computer network module creates an analog and/or digital wireless computer signal from, for example, the computer monitor and speaker output (analog) or through a USB, serial or parallel port (digital). This wireless computer signal is transmitted to a antenna node device where it is injected onto the coax network. The computer signal is then received by a TV network module and converted to a local television channel that can be tuned in by any television connected to the coax network. Further, another antenna node device receives the computer signal and re-transmits it as a wireless signal to a receiving device, such as the wireless display terminal (wireless display terminal). As shown, a second computer may be networked to the first computer (wireless digital data) via the antenna node devices 200 and the pre-existing coax. Thus, the computer monitor and speaker output is available on any television in the home, and is wirelessly available as a relatively low emission anywhere in the home. Also, the computer can be network with other digital devices anywhere in the home.

As an example, if a computer is located in a room at one end of the house (with or without a coax terminal), in accordance with the present invention (1) transmit a wireless carrier frequency signal containing audio, video and data to a antenna node device, (2) convert the signal if necessary to a carrier frequency that travels over the home coax network without interfering with the cable television channels), (3) receive the signal by another antenna node device somewhere else on the coax network, (4) convert the signal back to the original wireless carrier frequency, and (5) emit the wireless signal via a directional antenna so that it can be received by another wireless device. The use of the wire network as a transmission path between rooms allows the radiated power level to be kept low everywhere in the home, and still have a clear and consistent signal available any where in the home (and yard).

As another example, a pre-existing wired Ethernet network is installed on a few of the computers in an office. Typically, adding additional computers to this Ethernet network would require the expense and difficulty of stringing new wires. However, with the hybrid wired/wireless networking solution created by the antenna node devices 200, additional computers can be connected very easily.

In many home installations there is no one wired network available that can carry data from a source location (in this case, a computer) to any room in the home. Wireless rf networking systems are less than adequate due to attenuation of the rf signal within the home because of, for example, the absorption and reflection of the rf signal when it encounters typical home building materials such as drywall, foil-backed insulation, concrete block, etc. Simply boosting the antenna power output from the point source of the signal (in this example, the location of the computer) to the receiving antenna (in this case, the mobile wireless display terminal wireless display terminal) is often not an effective solution. For such point-to-point transmission to be effective, the signal power may have

to be boosted to a level that exceeds the maximum FCC (or other regulatory body) limitations. Also, the boosting of the antenna output may be undesirable in situations where the signal will interfere with other devices, or be susceptible to eavesdropping be neighbors, etc.

To overcome this problem, a combination of antenna node device antenna nodes can be installed at suitable locations throughout the home. A video signal (can be any combination of data, video, audio, control, etc.) originating from a computer is injected onto a coax cable network in the home. This signal is carried over the coax network to a coax network antenna node where it is amplified and wirelessly transmitted to a powerline connected rf repeater unit. The signal carried on the coax may be up converted or down converted to a suitable carrier frequency for improved transmission over the coax, and then up converted or down converted, as necessary, for rf transmission between the coax network antenna node and the powerline connected rf repeater unit. The powerline connected rf repeater unit may be a passive device which receives the rf signal from the coax antenna node and amplifies and retransmits it as an rf signal (up converting and down converting can be performed by a mixer associated with the powerline connected rf repeated if needed). The rf signal emitted by the powerline connected rf repeater is received by a phoneline antenna node which is within range of the transmitted signal. The signal may again be amplified, down converted or up converted, as needed so that it can be carried by the phoneline wired network (without interfering with other signals carried on the network such as voice, data, etc.). This signal is received at a second phoneline antenna node, where again it can be up converted, down converted, amplified (or attenuated) as needed so that it is optimally conditioned for transmission to the wireless display terminal wireless display terminal without exceeding regulatory power limits, and with less susceptibility to unauthorized reception.

In this way, the signal originating from the computer is transmitted over the pre-existing hardwired home networks (coax and telephone) with a powerline connected rf repeater bridging the two wired networks, for ultimate reception by a wireless display terminal. In this example, the wireless display terminal is located at a room in the home where direct point-to-point transmission from the computer to the wireless display terminal would have been inadequate due to signal attenuation. Of course, this example is for illustrative purposes and, for example, the powerline connected rf repeater unit may not be necessary (that is, the bridging of the coax and phoneline networks could be direct between their respective antenna nodes).

Figure 64(a) is a front view of an embodiment of the inventive antenna node device directional antenna coax faceplate.

Figure 64(b) is a perspective view of the embodiment of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a).

Figure 64(c) is an isolated perspective view of a directional antenna and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a).

Figure 64(d) is an isolated side view of a directional antenna and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a).

Figure 65(a) is an isolated side view of the directional and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 64(a) connected to a coax network. the controllable frequency filter keeps the channels that the user does not want emitted wirelessly from being transmitted to the directional antenna. used to keep "secure" data channels from exiting the coaxial network, but controllable so that these channels can be transmitted when the user desires a wireless connection the secure channels. Alternatively, the filter can be preset with some channels, say channel 1 of the 2.4GHz band always blocked from transmission to the wireless antennas and otherwise out of the home hardwired networks. This channel is then the secure channel, with data being carried by this channel's frequency being block from exiting the home's coax or other hardwire networks. Further, the data on the secure channel can be handshake packetized and/or encrypted, with only those devices that have the appropriate handshake or encryption key able to read the data

Figure 65(b) is block diagram of an embodiment of the directional and coax connector of the inventive antenna node device directional antenna coax faceplate shown in Figure 65(a). In response to addressed control signals, the controlling means controls which channels are transmitted via the directional antenna, and at what power level the channels are transmitted. If necessary, a capacitor keeps power steady even when dc control signals are transmitted. Supplied low voltage power is received from the coax (injected by one of the devices on the network) to the circuit components.

Figure 65(c) illustrates a home or office networked home having antenna node devices 200 (the inventive antenna node device 200) connected at various terminal ends of a pre-existing coax network, and further illustrating the inventive capabilities of wireless signal attenuation within the zone of coverage. When the wireless display terminal (the inventive wireless display terminal) is stationary, such as when the user is sitting on a couch, the power output of the "best" antenna is reduced to a level that is just above the level required for a clear, consistent signal. The power output of the other antennas can be attenuated fully, unless they are communicating with other devices

Figure 65(d) illustrates a home or office networked home having antenna node devices 200 connected at various terminal ends of a pre-existing coax network, and further illustrating the inventive capabilities of wireless signal handoff between two antenna node devices 200 within the zone of coverage. When the wireless display

terminal is moved to another room, a "hand-off" occurs between the antenna in previous room and the antenna in the next room.

Figure 65(e) illustrates a home or office networked home having a combination of coaxial antenna node devices 200 and phoneline antenna node devices 200 installed, along with a powerline connected rf repeater unit 202, for creating a zone of coverage throughout a home. In many home installations there is no one wired network available that can carry data from a source location (in this case, a computer) to any room in the home. Wireless rf networking systems are less than adequate due to attenuation of the rf signal within the home because of, for example, the absorption and reflection of the rf signal when it encounters typical home building materials such as drywall, foil-backed insulation, concrete block, etc. Simply boosting the antenna power output from the point source of the signal (in this example, the location of the computer) to the receiving antenna (in this case, the mobile wireless display terminal wireless display terminal) is often not an effective solution. For such point-to-point transmission to be effective, the signal power may have to be boosted to a level that exceeds the maximum FCC (or other regulatory body) limitations. Also, the boosting of the antenna output may be undesirable in situations where the signal will interfere with other devices, or be susceptible to eavesdropping be neighbors, etc. To overcome this problem, a combination of the inventive antenna node device antenna nodes can be installed at suitable locations throughout the home. In the example shown in Figure 65(e), a video signal (can be any combination of data, video, audio, control, etc.) originating from a computer is injected onto a coax cable network in the home. This signal is carried over the coax network to a coax network antenna node where it is amplified and wirelessly transmitted to a powerline connected rf repeater unit 202. The signal carried on the coax may be up converted or down converted to a suitable carrier frequency for improved transmission over the coax, and then up converted or down converted, as necessary, for rf transmission between the coax network antenna node and the powerline connected rf repeater unit 202. The powerline connected rf repeater unit 202 may be a passive device which receives the rf signal from the coax antenna node and amplifies and retransmits it as an rf signal (up converting and down converting can be performed by a mixer associated with the powerline connected rf repeated if needed). The rf signal emitted by the powerline connected rf repeater is received by a phoneline antenna node which is within range of the transmitted signal. The signal may again be amplified, down converted or up converted, as needed so that it can be carried by the phoneline wired network (without interfering with other signals carried on the network such as voice, data, etc.). This signal is received at a second phoneline antenna node, where again it can be up converted, down converted, amplified (or attenuated) as needed so that it is optimally conditioned for transmission to the wireless display terminal wireless display terminal without exceeding regulatory power limits, and with

less susceptibility to unauthorized reception. In this way, the signal originating from the computer is transmitted over the pre-existing hardwired home networks (coax and telephone) with a powerline connected rf repeater bridging the two wired networks, for ultimate reception by a wireless display terminal. In this example, the wireless display terminal is located at a room in the home where direct point-to-point transmission from the computer to the wireless display terminal would have been inadequate due to signal attenuation. Of course, this example is for illustrative purposes and, for example, the powerline connected rf repeater unit 202 may not be necessary (that is, the bridging of the coax and phoneline networks could be direct between their respective antenna nodes).

Figure 66(a) is a side view illustrating a antenna node device having a directional antenna disposed at a signal optimizing angle. The directional antenna may be preset at an angle so that the orientation of the radiation emitting/receiving element is appropriate of the best signal transmission between the emitting/receiving element located at the faceplate height (

Figure 66(b) is a perspective view of the antenna node device shown in Figure 66(a).

Figure 66(c) is a perspective view of a antenna node device accessory antenna system for connecting with a pre-existing coax faceplate.

Figure 66(d) is a block diagram illustrating a antenna node device configuration comprising a wireless video/audio/data and control signal circuit for use within the inventive home or office network.

Figure 66(e)) is a block diagram illustrating a antenna node device configuration comprising a wireless video/audio/data and control signal circuit for use within the inventive home or office network, including a phone jack connection and a voltage peak filter for detecting dc control and data signals included as voltage peaks superimposed on a constant dc power supply signal.

Figure 66(f) is a graph illustrating the dc control and data signals included as voltage peaks superimposed on a constant dc power supply signal.

Figure 66(g) illustrates an obverse side of a printed circuit board construction of the inventive circuit for an embodiment of the antenna node device, the circuit including a rf signal amplifier and rf mixer for optimizing the signal transmission carried over the coax network, while allowing for a wireless signal within a suitable bandwidth (e.g., 2.4 GHz).

Figure 66(h) illustrates a reverse side of the printed circuit board construction of the inventive circuit shown in Figure 66(g).

Figure 66(i) is a perspective view of a antenna node device accessory antenna system for connection with a pre-existing coax faceplate.

Figure 66(j) is a perspective view of a antenna node device stand-alone antenna system for connection with a pre-existing coax terminal connector.

Figure 66(k) is a perspective view of a antenna node device directional antenna coax faceplate for replacement of a pre-existing coax faceplate.

Figure 66(l) is a block diagram illustrating a prototype construction embodiment of the inventive home or office network.

Figure 67(a) is a flowchart showing the operation of an inventive analog scrambler. The inventive analog scrambler can be used to add data security between networked devices, wired and wireless. If two or more transceiver 32 pairs are simultaneously using the available carrier bandwidth for communication, the central computer (microprocessor 22, Gateway device, etc.) can calculate the frequency adjustment and sync signal timing values so that there is no signal interference. The use of the handshake value received by the mobile terminal (or other device) allows a single central computer to effectively control the analog scrambling for two or more different data streams. For security, the two devices can be hardwired together for the exchange of the handshake value and frequency adjustment function. The transmission of the sync signal may obviate the need for a timing function.

Figure 67(b) is an example of the sync signal and frequency adjustment in accordance with the inventive analog scrambler. Frequency f = the center of the carrier wave band which is about 2 Ghz +/- some function -determined value where the value of f is within the range of the 2.4 Ghz allotted channels. The frequency band can be any of the licensed or unlicensed frequency bands available, most notably, the frequencies around 900MHz, 2.4GHz and 5 GHz.

Figure 68(a) is a block diagram illustrating a antenna node device configuration for use with a phone line network, and including device locating circuitry for use in determining the location of devices within the inventive home or office network. In accordance with the antena node devices described herein, two or more antenna members can be provided, each optimized for a particular frequency range (such as UHF, VHF, 900 Mhz, 2.4 GHz, 5 GHz, etc.). In any of the devices (wireless display terminals, antenna nodes, set top boxes, accessory boxes, etc.) described herein, antenna diversity can be employed to prevent the problems of multi-path cancellation. The components of the various configurations of the inventive antenna node can be provided in any suitable combination, each configuration shown may or may not show every component that would be in a working version

Figure 68(b) is a block diagram illustrating a antenna node device configuration for use with a power line network for communicating wireless and hardwired signals transmitted within the inventive home or office network. The antenna member(s) can be configured and dimensioned for transmission/reception of various RF frequencies, including but not limited to the licensed and unlicensed frequencies as designated by the

FCC. The controllable filters/amplifiers/attenuators are under the control of a microprocessor 22 or the central computer so that the power and frequency of the RF signal emitted from the antenna member(s) is selective. In response to addressed control signals, the controlling means controls which channels are transmitted via the directional antenna, and at what power level the channels are transmitted.

Figure 69(a) is a flowchart showing the steps of determining the appropriate signal power transmitted from antenna nodes within the inventive home or office network;

Figure 69(b) is a flowchart showing the steps of determining the location of a device located within the inventive home or office network. This technique can be used to find wireless remotes, keyboards, children (with the inventive personal locator), wireless display terminals, etc . A map of the home can be obtained by bringing a wireless device to the corner of each room and, through software, noting where the room corners are (location determined relative to antenna nodes). The radius R of the identified device and each antenna node can be obtained by determining the delay between the transmission of the "location finder' handshake from each antenna node(as controlled by central computer or microprocessor 22) and the reception of the corresponding location "ping" from the device.

Figure 69(c) is a flowchart showing the steps of determining the appropriate signal power transmitted between antenna nodes and wireless devices within the inventive home or office network.

Figure 69(d) illustrates the determination of the location of a device by detecting the distance between the device and two or more antenna nodes within the inventive home or office network.

Figure 69(e) is a flowchart showing the steps of using a frame buffer to limit the display degradation due to the disruption of a video signal transmitted to a device connected to the inventive home or office network.

Figure 69(f) is a flowchart showing the steps of compensating for microwave oven interference when transmitting data to a device connected with the inventive home or office network.

Figure 69(g) is a flowchart showing the steps of compensating for microwave or other pulsating interference when transmitting video data to a device connected with the inventive home or office network.

Figure 70(a) illustrates the use of the inventive wireless display device for displaying Internet and intranet content in external network environments, such as schools, airports, airplanes, grocery stores and the like. Each wireless display terminal logs into the network by a handshake (like a cellular telephone). The wireless display terminal is then allocated a specific "slice" of the available spectrum and transmission timing - like a mainframe communicating with a bunch of users on dumb terminals.

For data such as internet data, a single frame or portion thereof (webpage) is all that needs to be transmitted to each user before another user can be allocated the transmission "space". Each user is given a sync code from the Gateway so that his wireless display terminal knows when to expect the next frame (e.g., webpage) reception (if there is one ready for him) and so that the Gateway knows when to expect data (such has hyperlink clicks) from the user. The webpages for the users are buffered at the Gateway. Preferably, a full page is received and buffered before it is transmitted to the user. It may be transmitted as a single video frame, with the hyperlinks mapped in the manner described herein. The user's hyperlink selection is transmitted to the Gateway in the form of an RF signal containing the grid coordinate which is compared with the hyperlink map to determine which hyperlink has been clicked. The grid coordinate can be determined from a "standard" origin, such as the top left corner of the webpage (the grid can be resized if the page is resized to accommodate page scrolling and resizing). The data that is transmitted between the wireless display terminal display and the Gateway consists of video frame-type pages from the Gateway to the wireless display terminal and hyperlink grid coordinates from the wireless display terminal to the Gateway. Other data, such as handshake information can be included with the transmissions to ensure that the Gateway "knows" which wireless display terminal is communicating with it and so that the wireless display terminal "knows" that it is its data being received. The handshake information can also be used to enable more efficient communication between the Gateway and multiple users - optimizes idle time because data can be sent or received out of sync order. Can also provide prioritization of communication allowing, for example, a preferred wireless display terminal to gain Gateway access ahead of others. Otherwise, if a frame is not ready for that user, then he has to wait until his next "sync time" until he can get another. wireless display terminals are capable of analog and digital reception. The analog channels may be be used for "public" data, or when receiving multimedia signals in the home. The digital reception may be used for encrypted data reception when in the public network, to allow private web browsing, email, etc. through the Gateways.

Figure 70(b) is a flowchart showing the steps of transmitting, receiving and displaying Internet and intranet content on networked display devices. A start page is broadcasted from the Gateway for reception by display devices used by users located within the range of the Gateway network (can be wireless or wired broadcast). The start page may be, for example, a web browser "portal" page stored on the Gateway that is the first page transmitted to any display unit when it begins an Internet session or otherwise wishes to receive information (television channels, intranet content, closed-circuit video, etc.) from the Gateway source. The start page can include links to intranet sites (for example, in an airport environment, it may include flight information, terminal map, driving directions, rental car and airline information, etc.). Some of the

intranet data can be refreshed from the Internet connection - i.e. traffic and weather reports. Since this type of data is likely to be frequently accessed by different user, it can be cached as part of the intranet data, and periodically refreshed, thus obviating the need for individual access to certain Internet pages. The Internet-based alert system described herein can be employed to ensure that "breaking" news from the Internet is quickly available as intranet data. The start-page can be transmitted on a "public" channel - available simultaneously to all the display device in the network. Once a display device sends it first hyperlink request - i.e., the grid coordinates of one of the hyperlinks on the start page, along with its identifying handshake- a "private" connection channel is formed between the display device and the Gateway along the lines described herein, or using known technology such as that employed by cellular telephone networks. A location, such as an airport, may have multiple Gateways disposed at locations throughout the airport terminals. As a user moves about the terminals, the display unit is handed off between the Gateways. Also, frequency hopping, spread spectrum, encryption, or other suitable techniques, can be used to transmit secure webpage or other content data. The webpage data can be transmitted as analog information, rather than digital, since there is little opportunity for digital compression in the moving picture sense, and thus digital transmission may be too bandwidth intensive to accommodate numerous simultaneous users. The display device receives and converts the analog signal (for example, a composite video signal) containing a frame of a video signal as a web page. Thus, using the NTSC TV standard as a guide, 6 MHz of analog bandwidth can transmit about 30 webpages/second - allowing for the accommodation of many users from a single Gateway - particularly if multiple analog transmission channels are available. HDTV or computer monitor-type resolutions may require additional bandwidth as compared with the conventional television-type resolution. Sensitive data, such as email, may need special processing to keep the email private if it is transmitted as an analog video frame. Or, some data may be transmitted as digital, more bandwidth intensive, signals to enable digital encryption and other privacy techniques to be employed.

Figure 71(a) is a flowchart showing the steps of using Internet-based information triggers for controlling events within a networked home or office. The subscriber preferences include the online (Internet, intranet, etc) triggers (stock news, tv programs, weather alerts, video and telephone alert, with advanced caller id, news reports, etc.

Also included in the subscriber preferences are the events that are to be occur in the home in response to the detection of the alerts - turn on certain television(s), turn up volume, ring telephone (distinctive ring), compose PIP of television and internet content with computer and turn selected televisions to the local computer channel, etc. The trigger events are stored on the home's central computer, which protects the

subscriber from anyone manipulating the home via a hacked Internet connection (events can include encryption and password protection). The online triggers are uploaded to the home or office server and compared with a constantly updated information data base to determine the occurrence of a subscriber's trigger. When a trigger occurs, the home or office server notifies the subscribers computer (either through Instant Message-type communication (constant connections or when the subscriber is logged into the system) or email-type notification (dial-up connections)). The subscriber's computer can be programmed to dial up connection and check for email-type notification at certain times.

Figure 71(b) is a table showing examples of subscriber-selected online triggers.

Figure 71(c) is a table showing examples of subscriber-selected trigger events.

Figure 72(a) illustrates six frames of a video stream containing six pages of a web site. In accordance with the present invention, the six frames of the website are transmittable as video frame date to enable high speed transfer of the entire website via a television signal transferring system such as cable television. Using, for example, a conventional NTSC broadcast television channel carrying one page per video frame, the entire six pages of the website can be transmitted in about .2 seconds. In accordance with the present invention, the web pages are generated as individual frames of a video stream. As an example, an NTSC video transmission has a frame rate of about 30 frames per second. Thus, in accordance with the present invention, the six pages of the website shown in Figure 72(a) can be transmitted in about two tenths of a second. The static display information is contained within the display area of the video frame. The overscan area or the vertical blanking interval (or other displayed and/or non-displayed area) of the video frame or video signal is used to carry hyperlink and other non-display information.

Figure 72(b) illustrates a blank browser page which is used to navigate through the downloaded web pages and to make a connection with the Internet to acquire additional information not included in the transmission. For example, the transmitted web site may include hyperlinks to additional web pages and web sites which can be accessed through a modem connection with the Internet. The blank browser page includes a display area in which is inserted the display information retrieved from the received video transmission.

Figure 72(c) shows the display information contained in Frame1 of Figure1 displayed within the browser frame window. In accordance with the present invention, the displayed webpage looks the same as a webpage retrieved from the Internet, although is has been transmitted at a substantially higher rate of transmission than is available from a conventional Internet connection.

Figure 72(d) illustrates a single frame from the video stream shown in Figure 72(a). The frame includes the display information which is contained within the displayed image area. The frame also includes the hyperlink and other non-display information

which is contained within the non-display portion of the video frame or video signal. The non-display information shown in Figure 72(d) is, for illustrative purposes, indicated in English words. However, as is described below, this non-display information is preferably transmitted in digital form via the use of the available states of pixel information contained within the video signal. The display information is a static frame of video data. Thus, in order for the hyperlinks to be activatable, the position and boundaries of the hyperlink must be determined. Do the hyperlink by order and reached by tabbing through the hyperlink order, also in the voice recognition system, the spoken word for the hyperlink and the alternative forms expected to be spoken can be included in the hyperlink information to enable voice recognition. For example, the hyperlink "about the company" would include variations of the phrase "about the company" The non-display information that is contained within the video signal may include hyperlink information including the link title, image location, the target of the link, and what operation(s) is to be performed when the link is clicked. For example, the hyperlink information may include an operation command that changes the color of all the black pixels to blue when clicked. Thus, once the hyperlink is clicked, all the black pixels that make up the text of the hyperlink graphic are changed to blue, giving a visual indication to the user that this hyperlink has been activated. The hyperlink is activated when the cursor enters within the image location boundaries and the mouse is clicked. In other cases, for example in the use of a remote control that includes a means for tabbing through the hyperlinks, the hyperlink is activated when the hyperlink is tabbed to, and the enter button or other such button on the remote control is clicked. The image location is relative to some standard landmark on the page such as the top left corner or other suitable page landmark. The "link to" information for the particular hyperlink indicates what the target of the hyperlink is. In this case, for example, the hyperlink with the link title "about the company" is at a specific image location designated by a rectangle determined by the position of the top left corner and bottom right corner relative to the page landmark. The link "about the company" when activated causes the video frame2 in the example shown in Figure 72(a) to be retrieved from the video memory and its display image is displayed as the next web page. The non-display display information is deciphered as will be described below and loaded, for example, into RAM so that this new page's hyperlinks and other non-display information can be utilized. Other operations can be performed, such as controlling televisions, communication devices, lights, security systems, and the like, and the links can be to other internet content or to controlling appliance like VCRs. The hyperlinks contained in the webpage shown in Figure 72(d) include links to the other webpages that are shown in Figure 72(a). For example, the link title "fact sheet" when activated will bring up video frame3 through the operation "goto linked page". Another link towards the bottom of the page shown in Figure 72(d) is titled "Point Blank Designs".

This link when activated performs the operation of opening a new email message with the email address nycs8@aol.com. The hyperlinks can perform various other operations typically done by hyperlinks contained in Internet webpages. Further, the hyperlinks can be used to activate or operate local devices, such as VCRs, telephone systems, computers, televisions and the like.

Figure 72(e) illustrates the various links and their operation that results when the hyperlinks shown in Figure 72(d) are activated.

Figure 72(f) illustrates another series of webpages that are transmitted as video data. In this case, the web pages consist of a television programming guide. The programming guide includes a program grid that has television shows that are available on, for example, a cable television provider's system. In accordance with this aspect of the invention, the television programming guide can be transmitted to the cable television subscribers complete with webpages that correspond to the various viewing choices that are available. The portion of the video signal that is captured by the subscriber's box can be customized depending on the subscriber's preferences and viewing habits. Thus, for example, a subscriber who is interested in science fiction can have in-depth webpages captured that pertain to television programs that pertain to this genre. Further, by determining the demographics of the particular subscriber, specific commercial messages, news reports, advertising incentives and the like and can captured from the television signal. As shown, the display displayed information for a page can be send as a single video page. One or more video frames can be used to carry the corresponding hyperlink and related information. For example, if the page has a lot of hyperlinks, all the hyperlink data may not fit within the available non-displayed portion of the television signal associated with that frame. Thus, the link data can be included in the adjacent video frame both in the display area and the non-display area.

Figure 72(g) shows a web page with the corresponding non-display data included along with the page. In this case, the non-display data includes the page title "entrypage", page location "video A1 frame1", and the page reception information. This page reception information may include the frame number, in this case, 2132507, followed by the reception date, in this case, 01/15/1999. This page reception information can be used as the page link designation or otherwise used to keep track of the various frames of webpage video data that is received. Also included is the element data for the various graphic elements making up the page. The element data includes the page element title, the image location, the element order and the element type. Thus, for example, if the viewer wishes to obtain an editable text clipping from the web page, he can do so by clicking on the desired text and copying the text image to an OCR program which would convert the text image into editable text.

The type of data for each page element can be included in the page data. For example, text data can be identified as text, contained within predefined boundaries, so that the text image can be captured and converted into editable text using an OCD-type program. Animation or motion video can be included by linking each frame of the animation to the additional pages containing the other frames. During playing of the animation clip, each page in the animation series is displayed at the appropriate frame rate, the other page elements remain constant. If there are two or more pages with video or animation content, their video content can be combined into a single page. When viewed, the other page content remains fixed and acts as a mask while the moving image content of the page is played behind the mask. That is, the mask has a window that lets the video image content come through. For images that might be "blown up", the image data can be increased so that the pixel resolution of the blown up image is high. Pixel information is used to carry binary data, hyperlinks, data types, etc. Pixel state (on/off, luminosity, color, etc. can be used to convey the information. To decode, the pixel data is retrieved from the video frame. Video content and TML content can be "pushed", that is, loaded onto a recording device such as a hard drive day and night or at appropriate times. This pushed content may be encrypted so that the content provider, such as a cable company, can charge for the encryption key. The hyperlinks can include links to video footage stored on the HD, or to be downloaded and stored (such as television programs that are coming on in the future, PPV or VOD). The hyperlinks can include links to Internet content, with access to the Internet content initiated with the link is clicked. The content can include daily newspapers with video linked news reports, catalogs, etc. with a check to determine the "freshness" of the downloaded content, only new content needs to be sent.

Figure 72(h) shows how the binary video data stream can be conveyed using just the on/off states of the pixels of the video image. In this case, the bright pixels represent binary digits 0 and the black pixels represent binary digit 1. Thus, the non-display information can be transmitted as part of the video information and later determined from the video information by detecting the bright and dark states of the pixels in serial order as they are displayed.

Figure 72(i) illustrates a video stream containing display page information contained within the displayed area of the individual video frames, and hyperlink page information and other non-display page information contained in the non-display area of the video signal or video page stream. The display information displayed the entire website page, or a portion of it, as a still frame taken from the received video frame signal. If the page is larger than a single frame, two or more video frames can be linked together with the link operation indicating that the browser is to display the pages with scrollability. The non-display information includes the targets of hyperlinks, page title and other information. This data can be transmitted as binary information that can be

discerned from the pixel information. To retrieve the binary data stream, the state of each pixel is determined, perhaps in its scan sequence or other predetermined order. This pixel state is converted into a binary data stream from which is determined the contained non-display information.

In accordance with the present invention, a browser-type computer program is provided for controlling the display of the html-type documents received as described above. This browser-type application has a number of advantages over conventional Internet web browsers, such as Netscape Navigator, Netscape Communicator and Microsoft's Internet Explorer. The inventive browser-type program requires relatively little computer memory to operate, making it particularly suitable for relatively inexpensive PDAs, set top boxes, and other such devices.

The videostreaming HTML document format described above can be obtained by converting other HTML-types of documents, such as those currently found on the Internet, into the videostreaming HTML document format. Thus, for example, Internet content can be collected from the Internet as is done conventionally using a desktop computer, and then this content can be converted into the inventive videostreaming HTML document format. This videostreaming HTML content can be then transferred from the desktop computer to, for example, a PDA thereby allowing low memory capacity devices, such as PDAs to store much larger quantities of Internet content than conventionally possible. The inventive browser-type program can also be used to convert other documents into hyperlinked videostreaming HTML documents for transmission to display devices. In accordance with this aspect of the present invention, a display device only needs to be able to display a frame (web page) of video information received from an "Internet or intranet Gateway" device. The display device does not have to be able to decode html, reconstruct GIF images for display, etc. These actions are done be the Gateway device. The display device receives the web page as frame of video (or as a still image) and it is displayed. If the display device includes buffering means for buffering data, then it can receive "bursts" of content information from the Gateway device, optimizing data transmission to multiple display devices. To activate, for example, a hyperlink a cursor location determining means onboard the display device determine where a superimposed cursor is located relative to the hyperlinks on the page when the user clicks on a hyperlink. This hyperlink location information is transmitted to the Gateway device where it is interpreted to determine which hyperlink the user intends to activate. The activation of the hyperlink by the user can be perform by other mechanisms, such as tabbing through the links on a page, etc. The information regarding where a hyperlink is located, what it is linked to, etc. is maintained by the Gateway thus alleviating the need to have much processing power, if any, onboard the display device for accessing the Internet or intranet content. Further, "public" channels can be provided that can be accessed by multiple displays

simultaneously for showing, for example, a movie or news report to users within a network environment such as an airplane, airport or grocery store.

Figure 72(j) illustrates a stream of video data provided along with hyperlink, page information and other non-videographic page information, with split static videographic page information provided along with split moving image videographic page information;

Figure 72(k) shows a block diagram of an inventive display device for use with the inventive method of transmitting hyperlinked information.

Figure 72(l) illustrates a wireless display device receiving a window of moving image videographic page information superimposed on a screen of static videographic page information.

Figure 72(m) shows a PDA-type wireless display device displaying static and moving videographic page information.

Figure 72(n) shows a blank page of a high speed HTML browser window in accordance with the prototype FaceSpan software program disclosed herein.

Figure 72(o) shows an internet page having the grid locations of the page's hyperlinks determined and the page displayed in the browser window shown in Figure 72(n).

Figure 73(a) shows an inventive wireless display terminal capable of displaying a screen image composed of video data simultaneously received from two or more wireless sources. The inventive wireless display terminal system includes control signal generating means for generating control signals for controlling at least one remotely located data source. The remotely located data sources may be, for example, a computer, a VCR, DVD, set top box or other multimedia device. As described elsewhere herein, the remotely located data sources include wireless signal transmitting devices that emit a wireless signal containing video, audio, and/or data information. A first wireless data signal receiving means receives a first wireless data signal (for example, a digital data signal containing internet content from a computer) Alternatively, the digital data signal can come from a wireless modem connected directly to wire network, such as a phone line or cable network. In this case, the wireless display terminal includes means for receiving the Internet content in the form of a wireless modem signal and creating a screen image dependent thereon, and means for requesting internet content through the wireless modem.

A second wireless signal receiving means receives a second wireless data signal (for example, a television channel from a set top box). A video processing device processes the video information contained in the first and the second wireless data signal. The video processing device is effective for outputting a composed video signal containing a screen image composed of a split screen or picture-in-a-picture display comprised of the video information. Stated otherwise, the video processing device is capable of creating a screen image that includes the digitally transmitted Internet content

having a PIP image of an analog transmitted television show. Such a video processing device is available from Oxford Micro Devices or Oxford Connecticut (www.omdi.com). Display driving means receives the composed video signal and outputs a display driving signal. A display, such as an LCD, receives the display driving signal and displays the screen image. Thus, in accordance with the present invention, a wireless display terminal is provided that allows a user to access the Internet while viewing a television program.

As the Internet becomes the source of computer applications, such as word processing, appointment books, etc., the inventive wireless display device will provide an inexpensive solution for performing most of the activities that are now done using a conventional desktop computer. In this case, the invenitve wireless display device may include a local storage device, such as a hard drive, to keep documents and other files locally available.

Figure 73(b) is a block diagram illustrating an antenna node device 200 for conditioning a wireless signal for communication over a pre-existing hard wire network **The antenna node device 200 includes an antenna for receiving a wireless signal. First conditioning means conditions the wireless signal into a wired medium transmission signal for effective transmission over a wired network. Connecting means connects the conditioning means to the wired network, whereby the received wireless signal is converted into the wired medium transmission signal and injected onto the wired network. The antenna node device 200 also includes means for receiving a wired medium transmission signal from a wired network, which may be a connection to an in-home cable network, or an inter-office Ethernet network. Second conditioning means conditions the received wired medium transmission signal into a wireless signal effective for wireless transmission. Emitting means, such as a directional antenna, emits the wireless signal, whereby the received wired medium transmission signal is converted into the wireless signal and emitted for reception by a remote wireless device. The first conditioning means includes an down-converter and the second conditioning means comprises a up-converter. The up-converter is effective for converting a received 900 MHz band signal to a 2.4 Ghz band signal, and the down-converter is effective for converting a received 2.4 Ghz band signal to a 900 Mhz band signal. Thus, for example, 2.4 Ghz wireless networking devices can use a pre-existing home cable network as a bridge for spanning long distances between wireless devices. The up-converting and down-converting of the signal**

enables it to be effectively transmitted through existing devices on the wire network, such as splitters and amplifiers.

Figure 73(c) illustrates the use of the inventive antenna node devices 200 in an office environment. In this case, the antenna node devices 200 provide an effective bridge between segments of a wired Ethernet (or other type) network, allowing for expansion of the in-office Ethernet network without requiring new difficult-to-install wires between the segments. Further, mobile devices, such as the inventive wireless display terminal, can be effectively brought into the office and connected with devices that are both wireless and hard wired connected to the Ethernet network.

Claims:

1.) A method for indicating the content recorded on a video tape, characterized by the steps of: determining content-indicating information corresponding to the content recorded on or to be recorded on a video tape; converting the determined content-indicating information into a recordable content signal; generating a recordable information signal for recording on the video tape including the recordable content signal corresponding to the content-indicating information; transferring the recordable information signal to a recording head of a video tape recorder; and controlling the video tape recorder to record the recordable information.

2.) A method of indicating the content recorded on a video tape according to claim 1; further comprising determining control cue information for use in automatically controlling a video tape recorder; and wherein the step of generating the recordable information signal includes generating the recordable information signal including a recordable control cue signal corresponding to the control cue information.

3.) A method of indicating the content recorded on a video tape according to claim 2; wherein the content-indicating information comprises HTML data.

4.) A method of indicating the content recorded on a video tape, characterized by the steps of: controlling a video recorder to playback a recordable information signal including a recordable content signal previously recorded on a video tape; transferring the recordable information signal to an information signal detector; and detecting content-indicating information from the recordable content signal so that a representation of the content of television programs recorded on the video tape can be displayed.

5.) A method of indicating the content recorded on a video tape according to claim 4; wherein the recordable information signal includes a recordable control cue signal; and further comprising the step of detecting control cue information for controlling the video tape recorder; and automatically controlling the video tape recorder depending on the control cue information.

6.) A method of indicating the content recorded on a video tape according to claim 5; wherein the content-indicating information comprises HTML data.

7.) A video recording system for recording content-indicating information on a video tape, characterized by: content determining means for determining content-indicating

information corresponding to the content recorded on or to be recorded on a video tape; converting means for converting the determined content-indicating information into recordable content data; generating means for generating a recordable information signal for recording on the video tape including content signal generating means for generating a recordable content signal corresponding to the recordable content data; transferring means for transferring the recordable information signal to a video tape recorder; and video device controlling means for controlling the video tape recorder to record the recordable information.

8.) A video recording system for recording content-indicating information on a video tape according to claim 7; further comprising cue determining means for determining control cue information for automatically controlling a video tape recorder; wherein the generating means includes means for generating the recordable information signal including cue signal generating means for generating a recordable control cue signal corresponding to the control cue information, and combining means for combining the recordable content signal with the recordable cue signal to generate the recordable information signal.

9.) A video recording system for recording content-indicating information on a video tape according to claim 8; where the video device controlling means includes playback controlling means for controlling the video recorder to playback the recordable information signal including the recordable content signal previously recorded on the video tape; detecting means for detecting the content-indicating information from the recordable information signal so that an indication of the recorded content of the video tape can be displayed; and wherein the transferring means includes means for transferring the recordable information signal to an information signal detecting means.

10.) A video recording system for recording content-indicating information on a video tape according to claim 9; wherein the detecting means includes means for detecting control cue information from the recordable information signal; and further comprising device control signal emitting means for emitting device control signals for automatically controlling the video tape recorder depending on the control cue information under the control of the computer.

11.) A video recording system for recording content-indicating information on a video tape according to claim 10; wherein the content-indicating information comprising HTML data.

12.) A home multimedia network, characterized by: a computer node including computer display local channel generating means for generating a computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a computer locatable at the computer node, the computer display local television channel being effective for allowing displaying of video data generated by the computer on a television located on the home multimedia network remotely from the computer, the computer node also including device control signal generating means controllable by the computer for generating device control signals transferable over the home multimedia network and effective to selectively control at least one video device located on the home multimedia network remotely from the computer, the computer node further including computer control signal receiving means for receiving computer control signals transferred over the home multimedia network; and a video device node including device control signal emitting means for receiving the device control signals and for emitting video device control signals effective for controlling a video device located on the home multimedia network remotely from the computer so that the video device can be remotely controlled by the computer, the video device node further include computer control signal generating means controllable by a user input device for generating computer control signals transferable over the home multimedia network so that the computer can be remotely controlled in response to a user input.

13.) A home multimedia network according to claim 12; further comprising video device local channel generating means for generating a video device local television channel containing a video output signal of the at least one video device located at the at least one video device node on the home multimedia network.

14.) A home multimedia network according to claim 12; further comprising at least one microphone input located at a location on the home multimedia network for receiving microphone signals; selecting means for selecting the input of the microphone signals; and adding means for adding the selected input of the microphone signals to the home multimedia network.

15.) A home multimedia network according to claim 14; further comprising means for generating audible sound signals corresponding to the selected input of the microphone signals at a location on the home multimedia network remote from the location of the at least one microphone input receiving the selected input of the microphone signals.

16.) A home multimedia network according to claim 15; further comprising at least one video camera input located at a location on the home multimedia network for receiving

video camera signals; selecting means for selecting the input of the video camera signals; and wherein at least one of the computer display local television channel generating means and the video device local television channel generating means includes means for including the selected input of the microphone signals and the selected input of the video camera signals in the corresponding computer display local television channel and the video device local television channel.

17.) A home multimedia network according to claim 16; further comprising means for connecting the selected input of the microphone signals to a telephone system.

18.) A home multimedia network according to claim 17; further comprising means for notifying the existence of a received telephone call on at least one display connected to the home multimedia system and means for answering the received telephone call and selecting the input of the microphone signals received by the microphone input.

19.) A home multimedia network according to claim 18; further comprising means for determining a telephone number of a received telephone call; and means for displaying the determined telephone number on said at least one display.

20.) A home multimedia network according to claim 13; further comprising means for connecting to the Internet and downloading Internet data; Internet video output signal generating means for receiving the Internet data and generating an Internet video signal dependent thereon; and wherein the device local channel generating means includes means for generating the video device local television signal containing the Internet video output signal data.

21.) A home multimedia network according to claim 12; further comprising means for connecting the computer to the Internet and downloading Internet data; and wherein the computer display local channel generating means includes means for generating the computer display local television signal containing the Internet video output signal data.

22.) A home multimedia network, characterized by: a first computer node including computer display local channel generating means for generating a computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a computer locatable at the computer node, the computer display local television channel being effective for allowing displaying of video data generated by the computer on an ordinary television located on the home multimedia network remotely from the computer, device control signal generating means controllable by the computer for generating device control signals transferable

over the home multimedia network and effective to selectively control at least one video device located on the home multimedia network remotely from the computer, computer control signal receiving means for receiving computer control signals transferred over the home multimedia network, content determining means for determining content-indicating information corresponding to the content recorded on or to be recorded on a video tape, cue determining means for determining control cue information for automatically controlling a video tape recorder, converting means for converting the determined content-indicating information into recordable content data, generating means for generating a recordable information signal for recording on the video tape, the generating means including content signal generating means for generating a recordable content signal corresponding to the recordable content data, cue signal generating means for generating a recordable control cue signal corresponding to the control cue information and combining means for combining the recordable content signal with the recordable cue signal to generate the recordable information signal, transferring means for transferring the recordable information signal to a video tape recorder, and video device controlling means for controlling the video tape recorder to record the recordable information.

23.) A home multimedia network according to claim 22; where the video device controlling means includes playback controlling means for controlling the video recorder to playback a recorded information signal including the recordable content signal previously recorded on the video tape; detecting means for detecting the content-indicating information from the recordable information signal so that an indication of the recorded content of the video tape can be displayed; and wherein the transferring means includes means for transferring the recordable information signal to an information signal detecting means.

24.) A home multimedia network according to claim 23; comprising a video device node including video device local channel generating means for generating a video device local television channel containing a video and audio output of the video recorder located at the at least one video device node on the home multimedia network, wherein the recorded information signal played back from the video tape is included in the video and audio output of the video recorder; device control signal emitting means for receiving the device control signals and for emitting video device control signals effective for controlling the video recorder located on the home multimedia network remotely from the computer so that the video device can be remotely controlled by the computer, the video device node further including computer control signal generating means controllable by a user input device for generating computer control signals

transferable over the home multimedia network so that the computer can be remotely controlled in response to a user input.

25.) A home multimedia network according to claim 24; wherein the detecting means includes means for detecting control cue information from the recordable information signal; and further comprising device control signal emitting means for emitting device control signals for automatically controlling the video tape recorder depending on the control cue information.

26.) A home multimedia network according to claim 24; wherein the video device local channel generating means includes means for generating the video device local television channel as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless ir signals; and the computer control signal generating means includes means for generating the computer control signals as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless ir signals.

27.) A home multimedia network according to claim 24; wherein the video device local channel generating means includes means for generating the video device local television channel as rf signals carryable over a pre-existing home coaxial cable television network; and the computer control signal generating means includes means for generating the computer control signals as dc signals carryable over the pre-existing home coaxial cable television network.

28.) A home multimedia network according to claim 22; wherein the computer display local channel generating means includes high-definition signal generating means for generating the local television channel as containing the video output signal as high-definition-display-device-driving information for driving a high definition display such as a computer monitor or high definition television; and further comprising a high-definition node having display-driving means for receiving the local television channel containing the high-definition-display-device-driving information and for driving a high definition display device.

29.) A home multimedia network according to claim 22; wherein the first computer node includes computer data signal generating means for generating a computer data signal in accordance with computer data received from the computer for transfer of the computer data signal over the home multimedia network; and further comprising a computer device node having computer data signal receiving means for receiving the

computer data signal from the home multimedia network for transfer to a second computer or computer data using device such as a printer or data storage device locatable at the second computer node.

30.) A home multimedia network according to claim 28; wherein the computer data signal generating means includes means for generating the computer data signal as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless ir signals.

31.) A home multimedia network according to claim 22; further comprising a second computer node having another computer display local channel generating means for generating another computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a second computer, and another computer control signal receiving means for receiving the computer control signals transferred over the home multimedia network.

32.) A home multimedia network according to claim 31; wherein the other computer display local channel generating means includes means for generating the other local computer display local television channel as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless ir signals.

33.) A home multimedia network according to claim 31; wherein the other computer display local channel generating means includes means for generating the other local computer display local television channel as rf signals carryable over a pre-existing home coaxial cable television network; and the other computer control signal receiving means includes means for receiving the computer control signals as dc signals carryable over the pre-existing home coaxial cable television network.

34.) A home multimedia network according to claim 22; further comprising addressable controlling means including an address signal generator for generating an address signal and address signal receiver for receiving the address signal, the address signal generator being controllable by the computer and the address signal receiver being effective for controlling the device control signal emitting means to emit the device control signal depending on the received address signal.

35.) A home multimedia network according to claim 34; wherein the address signal generating includes means for generating the address signal as a signal carryable over a pre-existing home coaxial cable television network and connecting means for

connecting the address signal generator to the pre-existing home coaxial cable television network.

36.) A home multimedia network according to claim 22; further comprising a selectable channel filtering means for selectably filtering channel frequencies carried on a television signal source in communication with the home multimedia network, the selectably filtered channel frequencies being available for use as local television channels.

37.) A home multimedia network according to claim 22; wherein the computer display local channel generating means includes means for generating the computer display local television channel as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless ir signals; the transferring means includes means for transferring the information signal as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless ir signals; and the device control signal generating means includes means for generating the device control signals as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless ir signals.

38.) A home multimedia network according to claim 22; wherein the computer display local channel generating means includes means for generating the computer display local television channel as rf signals carryable over a pre-existing home coaxial cable television network; the transferring means includes means for transferring the information signal as rf signals over the pre-existing home coaxial cable television network; and the device control signal generating means includes means for generating the device control signals as rf signals carryable over the pre-existing home coaxial cable television network.

39.) A home multimedia network according to claim 22; further comprising at least one microphone input located at a location on the home multimedia network for receiving microphone signals; selecting means for selecting the input of the microphone signals; and adding means for adding the selected input of the microphone signals to the home multimedia network.

40.) A home multimedia network according to claim 39; further comprising means for generating audible sound signals corresponding to the selected input of the microphone

signals at a location on the home multimedia network remote from the location of the at least one microphone input receiving the selected input of the microphone signals.

41.) A home multimedia network according to claim 40; further comprising at least one video camera input located at a location on the home multimedia network for receiving video camera signals; selecting means for selecting the input of the video camera signals; and wherein at least one of the computer display local television channel generating means and the video device local television channel generating means includes means for including the selected input of the microphone signals and the selected input of the video camera signals in the corresponding computer display local television channel and the video device local television channel.

42.) A home multimedia network according to claim 41; further comprising means for connecting the selected input of the microphone signals to a telephone system.

43.) A home multimedia network according to claim 42; further comprising means for notifying the existence of a received telephone call on at least one display connected to the home multimedia system and means for answering the received telephone call and selecting the input of the microphone signals received by the microphone input.

44.) A home multimedia network according to claim 43; further comprising means for determining a telephone number of a received telephone call; and means for displaying the determined telephone number on said at least one display.

45.) A home multimedia network according to claim 23; further comprising means for connecting to the Internet and downloading Internet data; Internet video output signal generating means for receiving the Internet data and generating an Internet video signal dependent thereon; and wherein the device local channel generating means includes means for generating the video device local television signal containing the Internet video output signal data.

46.) A home multimedia network according to claim 24; further comprising means for connecting the computer to the Internet and downloading Internet data; and wherein the computer display local channel generating means includes means for generating the computer display local television signal containing the Internet video output signal data.

47.) An analog scrambler, characterized by: handshake transmitting means for transmitting a handshake signal from a mobile terminal to a central computer; receiving means for receiving the handshake signal; handshake value and frequency adjustment

function transmitting means for transmitting a handshake value and frequency adjustment fucntion to the mobile terminal from the central computer; determining means for determining if a received handshake value is correct; transmitting frequency adjusting means for adjusting the transmitting frequency of a wireless signal according to the frequency adjustment function; and receiving frequency adjusting means for adjusting the receiving frequency of a wireless signal according to the frequency adjustment function.

48.) An analog scrambler according to claim 47; further comprising password protection means for receiving a predetermined password for determining at least one of user preferences and network access.

49.) An antenna system for use in wireless network, characterized by: signal transducing means including an antenna member for transducing a signal carried over a wired network to a signal transmitted wirelessly; connecting means for connecting the signal transducing means to the wired network.

50.) An antenna system according to claim 49; wherein the antenna member comprising a directional antenna.

51.) An antenna system according to claim 50; wherein the wired network comprises a coax cable network.

52.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape, characterized by the steps of: determining content-indicating information corresponding to content to be recorded on a video tape; storing the determined content-indicating information in a tape database; determining a tape identification value for the video tape; storing the tape identification value in the tape database; generating a recordable identification signal for recording on the video tape corresponding to the tape identification value; transferring the tape identification signal to a recording head of a video tape recorder; and controlling the video tape recorder to record the tape identification signal.

53.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 52; wherein the tape identification signal is recorded substantially continuously during the recording of the content signal on the video tape.

54.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 53; wherein the tape identification signal is recorded non-continuously during the recording of the content signal on the video tape.

55.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 52; further comprising the steps of receiving a content signal containing content to be recorded on the video tape; mixing the content signal with the tape content and tape identification; transferring the tape content and tape identification mixed signal to the recording head of the video tape recorder; and controlling the video tape recorder to record the content and tape identification mixed signal.

56.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 55; wherein the content signal comprising a television signal containing a television program.

57.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 52; further comprising determining control cue information for use in automatically controlling the video tape recorder; a recordable control cue signal corresponding to the control cue information; and mixing the control cue signal with the content and tape identification mixed signal; transferring the mixed control cue, content and tape identification mixed signal to the recording head of the video tape recorder; and controlling the video tape recorder to record the control cue, content and tape identification mixed signal.

58.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 57; wherein at least one of the recordable control cue signal and the tape identification signal comprises a signal recordable on the video tape that is not displayed during the normal playback of the tape.

59.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 57; wherein at least one of the recordable control cue signal and the tape identification signal comprises an inaudible tone signal.

60.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 52; wherein the content-indicating information comprises HTML data.

61.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database, characterized by the steps of: determining control cues corresponding to the generation of control signals under the control of a computer for control a remotely located video recorder; storing the determined control cues in a tape database; determining a tape identification value for the video tape; storing the tape identification value in the tape database; generating a recordable identification signal for recording on the video tape corresponding to the tape identification value; transferring the tape identification signal to a recording head of a video tape recorder; and controlling the video tape recorder to record the tape identification signal.

62.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 61; wherein the tape identification signal is recorded substantially continuously during the recording of the content signal on the video tape.

63.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 61; wherein the tape identification signal is recorded non-continuously during the recording of the content signal on the video tape.

64.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 61; further comprising the steps of receiving a content signal containing content to be recorded on the video tape; mixing the content signal with the tape content and tape identification; transferring the tape content and tape identification mixed signal to the recording head of the video tape recorder; and controlling the video tape recorder to record the content and tape identification mixed signal.

65.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 64; wherein the content signal comprising a television signal containing a television program.

66.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 61; further comprising the step of determining a generation time for generating a control signal corresponding with the control cue information for use in automatically controlling the video tape recorder.

67.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 66; wherein the generation time is determined by generating a tone signal during the recording of the video tape, the tone signal being an indication of the generation time for generating the control signal corresponding with the control cue information.

68.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 67; wherein the generation time is determined as a time value occurring after a detection of the tone signal during the playback of the video tape.

69.) A method of controlling a video recorder through control signals generated by a remote computer in accordance with control cues stored in a tape database according to claim 68; wherein the time value corresponding to the generation time is stored in the tape database.

70.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape, characterized by the steps of: generating control signals using a computer for controlling a video recorder to playback a recordable identification signal previously recorded on a video tape; transferring the recordable identification signal to the computer; and determining a tape identification value for the video tape; comparing the tape identification value with data stored in a tape database; and determining content-indicating information stored in the tape data base corresponding to the tape identification value so that a representation of the content of television programs recorded on the video tape can be displayed.

71.) A method of controlling a video recorder through control signals generated by a remote computer for indicating the content recorded on a video tape according to claim 70; wherein the recordable information signal includes a recordable control cue signal; and further comprising the step of detecting control cue information for controlling the video tape recorder; and automatically controlling the video tape recorder depending on the control cue information.

72.) A method of indicating the content recorded on a video tape according to claim 71; wherein the content-indicating information comprises HTML data.

73.) A video recording system for recording content-indicating information on a video tape, comprising: content determining means for determining content-indicating

information corresponding to the content recorded on or to be recorded on a video tape; converting means for converting the determined content-indicating information into recordable content data; generating means for generating a recordable information signal for recording on the video tape including content signal generating means for generating a recordable content signal corresponding to the recordable content data; transferring means for transferring the recordable information signal to a video tape recorder; and video device controlling means for controlling the video tape recorder to record the recordable information.

74.) A video recording system for recording content-indicating information on a video tape according to claim 73; further comprising cue determining means for determining control cue information for automatically controlling a video tape recorder; wherein the generating means includes means for generating the recordable information signal including cue signal generating means for generating a recordable control cue signal corresponding to the control cue information, and combining means for combining the recordable content signal with the recordable cue signal to generate the recordable information signal.

75.) A video recording system for recording content-indicating information on a video tape according to claim 74; where the video device controlling means includes playback controlling means for controlling the video recorder to playback the recordable information signal including the recordable content signal previously recorded on the video tape; detecting means for detecting the content-indicating information from the recordable information signal so that an indication of the recorded content of the video tape can be displayed; and wherein the transferring means includes means for transferring the recordable information signal to an information signal detecting means.

76.) A video recording system for recording content-indicating information on a video tape according to claim 75; wherein the detecting means includes means for detecting control cue information from the recordable information signal; and further comprising device control signal emitting means for emitting device control signals for automatically controlling the video tape recorder depending on the control cue information under the control of the computer.

77.) A video recording system for recording content-indicating information on a video tape according to claim 76; wherein the content-indicating information comprising HTML data.

78.) A method of recording a television program with commercial break information using a video recorder characterized by the steps of; determining a television channel, date, time and duration for a selected television program; tuning in the determined television channel at the determined date and time to receive the selected television program by a computer controlled TV tuner; generating a local television channel characterized by computer generated video and audio output containing the selected television program; generating a control signal to tune a remotely located video recorder to the local television channel; computer monitoring the selected television program for the occurrence of a commercial break; detecting the start of a commercial break; generating a start-break signal indicating the start of the commercial break; mixing the start-break signal with the video and audio output containing the selected television program; and generating a control signal to control the video recorder to record local television channel containing the selected television program and the start-break signal.

79.) A method of using a computer to control a video recorder for recording a television program with commercial break information characterized by the steps of: receiving at least the audio portion of a selected television program by a computer; monitoring the received portion of the selected television program to determine the start of a commercial break; recording the selected television program on a video tape; memorializing the location on the video tape of the start of the commercial break; monitoring the selected television program to determine the end of a commercial break; and memorializing the location of the end of the commercial break.

80.) A method of using a computer to control a video recorder according to claim 79; further comprising using the computer to generate control signals to control the video recorder to record the selected television program.

81.) A method of using a computer to control a video recorder according to claim 79; wherein the step of memorializing the locations on the video tape of the start and end of the commercial break comprises the steps of determining an elapsed time from the start of the selected television program to the start of the commercial break; and storing the elapsed time in a tape database stored in a storage device controlled by the computer.

82.) A method of using a computer to control a video recorder according to claim 81; further comprising the steps of determining a tape identification value for the video tape; storing the tape identification value in the tape database; generating a recordable identification signal for recording on the video tape corresponding to the tape identification value; transferring the tape identification signal to a recording head of a

video tape recorder; and controlling the video tape recorder to record the tape identification signal.

83.) A method of using a computer to control a video recorder according to claim 81; wherein the step of memorializing the locations on the video tape of the start and end of the commercial break comprises the steps of determining an elapsed time from the start of the selected television program to the start of the commercial break; generating a data signal containing data indicating the determined elapsed time; and generating control signal to control the video recorder to record the data signal on the video tape.

84.) A method of using a computer to control a video recorder according to claim 81; further comprising the steps of determining a tape identification value for the video tape; storing the tape identification value in the tape database; generating a recordable identification signal for recording on the video tape corresponding to the tape identification value; transferring the tape identification signal to a recording head of a video tape recorder; and controlling the video tape recorder to record the tape identification signal.

85.) A home multimedia network, characterized by: a computer node including computer display local channel generating means for generating a computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a computer locatable at the computer node, the computer display local television channel being comprised of a local carrier frequency that is outside the frequency range allotted to cable television channels, the computer display local channel being effective for allowing displaying of video data generated by the computer on a television located on the home multimedia network remotely from the computer after the video output signal is demodulated from the local carrier frequency, the computer node also including device control signal generating means controllable by the computer for generating device control signals transferable over the home multimedia network and effective to selectively control at least one video device located on the home multimedia network remotely from the computer, the computer node further including computer control signal receiving means for receiving computer control signals transferred over the home multimedia network; and a video device node including device control signal emitting means for receiving the device control signals and for emitting video device control signals effective for controlling a video device located on the home multimedia network remotely from the computer so that the video device can be remotely controlled by the computer, the video device node further include computer control signal generating means controllable by a user input device for

generating computer control signals transferable over the home multimedia network so that the computer can be remotely controlled in response to a user input.

86.) A home multimedia network according to claim 85; wherein the video device node further comprises node modulation means for converting the computer display local channel to a television frequency of channel 3 or channel 4.

87.) A home multimedia network according to claim 85; further comprising video device local channel generating means for generating a video device local television channel containing a video output signal of the at least one video device located at the at least one video device node on the home multimedia network, the video device local television channel being comprised of a local carrier frequency that is outside the frequency range allotted to cable television channels.

88.) A home multimedia network according to claim 85; wherein the computer node further comprises node modulation means for converting the video device local channel to a television frequency of channel 3 or channel 4.

89.) A home multimedia network according to claim 85; further comprising at least one microphone input located at a location on the home multimedia network for receiving microphone signals; selecting means for selecting the input of the microphone signals; and adding means for adding the selected input of the microphone signals to the home multimedia network.

90.) A home multimedia network according to claim 89; further comprising means for generating audible sound signals corresponding to the selected input of the microphone signals at a location on the home multimedia network remote from the location of the at least one microphone input receiving the selected input of the microphone signals.

91.) A home multimedia network according to claim 90; further comprising at least one video camera input located at a location on the home multimedia network for receiving video camera signals; selecting means for selecting the input of the video camera signals; and wherein at least one of the computer display local television channel generating means and the video device local television channel generating means includes means for including the selected input of the microphone signals and the selected input of the video camera signals in the corresponding computer display local television channel and the video device local television channel.

92.) A home multimedia network according to claim 91; further comprising means for connecting the selected input of the microphone signals to a telephone system.

93.) A home multimedia network according to claim 92; further comprising means for notifying the existence of a received telephone call on at least one display connected to the home multimedia system and means for answering the received telephone call and selecting the input of the microphone signals received by the microphone input.

94.) A home multimedia network according to claim 93; further comprising means for determining a telephone number of a received telephone call; and means for displaying the determined telephone number on said at least one display.

95.) A home multimedia network according to claim 89; further comprising means for connecting to the Internet and downloading Internet data; Internet video output signal generating means for receiving the Internet data and generating an Internet video signal dependent thereon; and wherein the device local channel generating means includes means for generating the video device local television signal containing the Internet video output signal data.

96.) A home multimedia network according to claim 85; further comprising means for connecting the computer to the Internet and downloading Internet data; and wherein the computer display local channel generating means includes means for generating the computer display local television signal containing the Internet video output signal data.

97.) A home multimedia network, characterized by: a first computer node including computer display local channel generating means for generating a computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a computer locatable at the computer node, the computer display local television channel being effective for allowing displaying of video data generated by the computer on an ordinary television located on the home multimedia network remotely from the computer, device control signal generating means controllable by the computer for generating device control signals transferable over the home multimedia network and effective to selectively control at least one video device located on the home multimedia network remotely from the computer, computer control signal receiving means for receiving computer control signals transferred over the home multimedia network, at least one of content determining means for determining content-indicating information corresponding to the content recorded on or to be recorded on a video tape and cue determining means for determining control cue information for automatically controlling a video tape recorder, tape identification

determining means for determining a tape identification value for a video tape; storing means for storing the tape identification value in a tape database; generating means for generating a recordable tape identification signal for recording on the video tape, transferring means for transferring the recordable tape identification signal to a video tape recorder, and video device controlling means for generating a computer-controlled control signal for controlling the video tape recorder to record the recordable identification signal.

98.) A home multimedia network according to claim 97; where the video device controlling means includes playback controlling means for controlling the video recorder to playback a recorded tape identification signal previously recorded on the video tape; detecting means for detecting the tape identification signal so that identification of the video tape can be determined and matched with control cue and/or content-indicating data stored in the tape database.

99.) A home multimedia network according to claim 97; further comprising manually switchable local channel generating means for manually selecting a carrier frequency for computer display local television channel.

100.) A home multimedia network according to claim 97; further comprising a selectable channel filtering means for selectably filtering channel frequencies carried on a television signal source in communication with the home multimedia network, the selectably filtered channel frequencies being available for use as local television channels.

101.) A home multimedia network according to claim 97; wherein the computer display local channel generating means includes means for generating the computer display local television channel as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless IR signals; the transferring means includes means for transferring the information signal as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless IR signals; and the device control signal generating means includes means for generating the device control signals as at least one of dc signals, rf signals carryable over a conductive wire, light spectrum signals carryable over a fiber optic, wireless rf signals and wireless IR signals.

102.) A home multimedia network according to claim 97; wherein the computer display local channel generating means includes means for generating the computer display

local television channel as rf signals carryable over a pre-existing home electrical wiring network; the transferring means includes means for transferring the tape identification signal as rf signals over the pre-existing home electrical wiring network; and the device control signal generating means includes means for generating the device control signals as rf signals carryable over the pre-existing home electrical wiring network.

103.) A home multimedia network according to claim 97; further comprising at least one microphone input located at a location on the home multimedia network for receiving microphone signals; selecting means for selecting the input of the microphone signals; and adding means for adding the selected input of the microphone signals to the home multimedia network.

104.) A home multimedia network according to claim 103; further comprising means for generating audible sound signals corresponding to the selected input of the microphone signals at a location on the home multimedia network remote from the location of the at least one microphone input receiving the selected input of the microphone signals.

105.) A home multimedia network according to claim 104; further comprising at least one video camera input located at a location on the home multimedia network for receiving video camera signals; selecting means for selecting the input of the video camera signals; and wherein at least one of the computer display local television channel generating means and the video device local television channel generating means includes means for including the selected input of the microphone signals and the selected input of the video camera signals in the corresponding computer display local television channel and the video device local television channel.

106.) A home multimedia network according to claim 105; further comprising means for connecting the selected input of the microphone signals to a telephone system.

107.) A home multimedia network according to claim 105; further comprising means for notifying the existence of a received telephone call on at least one display connected to the home multimedia system and means for answering the received telephone call and selecting the input of the microphone signals received by the microphone input.

108.) A home multimedia network according to claim 107; further comprising means for determining a telephone number of a received telephone call; and means for displaying the determined telephone number on said at least one display.

109.) A home multimedia network according to claim 97; further comprising a video device local channel generating means for generating a local channel containing the output of a video device connected on the network.

110.) A home multimedia network according to claim 97; further comprising means for connecting to the Internet and downloading Internet data; Internet video output signal generating means for receiving the Internet data and generating an Internet video signal dependent thereon; and wherein the device local channel generating means includes means for generating the video device local television signal containing the Internet video output signal data.

111.) A home multimedia network according to claim 97; further comprising means for connecting the computer to the Internet and downloading Internet data; and wherein the computer display local channel generating means includes means for generating the computer display local television signal containing the Internet video output signal data.

112.) A home multimedia network, characterized by: a computer node including computer display local channel generating means for generating a computer display local television channel containing a video output signal corresponding to a computer display output signal generated by a computer locatable at the computer node, the computer display local television channel being comprised of a local carrier frequency that is outside the frequency range allotted to cable television channels, the computer display local channel being effective for allowing displaying of video data generated by the computer on a television located on the home multimedia network remotely from the computer after the video output signal is demodulated from the local carrier frequency, the computer node also including manual channel selecting means for manually selecting the local carrier frequency for the computer display local television channel from a predetermined set of local carrier frequencies; the computer node also including device control signal generating means controllable by the computer for generating device control signals transferable over the home multimedia network and effective to selectively control at least one video device located on the home multimedia network remotely from the computer, the computer node further including computer control signal receiving means for receiving computer control signals transferred over the home multimedia network; and a video device node including device control signal emitting means for receiving the device control signals and for emitting video device control signals effective for controlling a video device located on the home multimedia network remotely from the computer so that the video device can be remotely controlled by the computer, the video device node further include computer control signal generating means controllable by a user input device for generating computer control signals

transferable over the home multimedia network so that the computer can be remotely controlled in response to a user input.

113.) A home multimedia network according to claim 112; wherein the video device node further comprises node modulation means for converting the computer display local channel to a television frequency of channel 3 or channel 4.

114.) A home multimedia network according to claim 112; wherein the video device node further comprises video device local channel generating means for generating a video device local television channel containing a video output signal of the at least one video device located at the at least one video device node on the home multimedia network, the video device local television channel being comprised of a local carrier frequency that is outside the frequency range allotted to cable television channels, the video device node also including manual channel selecting means for manually selecting the local carrier frequency for the video device local television channel from a predetermined set of local carrier frequencies.

115.) A home multimedia network according to claim 112; further comprising an audio device local channel generating means for generating an audio device local audio channel containing an audio output signal of the at least one audio device located at the at least one video device node, the computer node or at an audio device node on the home multimedia network, the audio device local channel being comprised of either a local carrier frequency that is outside the frequency range allotted to cable television channels or a local carrier frequency that is tunable by a conventional radio device.

116.) A home multimedia network according to claim 114; wherein the computer node further comprises node modulation means for converting the video device local channel to a television frequency of channel 3 or channel 4.

117.) A home multimedia network according to claim 112; further comprising at least one microphone input located at a location on the home multimedia network for receiving microphone signals; selecting means for selecting the input of the microphone signals; and adding means for adding the selected input of the microphone signals to the home multimedia network.

118.) A home multimedia network according to claim 117; further comprising means for generating audible sound signals corresponding to the selected input of the microphone signals at a location on the home multimedia network remote from the

location of the at least one microphone input receiving the selected input of the microphone signals.

119.) A home multimedia network according to claim 118; further comprising at least one video camera input located at a location on the home multimedia network for receiving video camera signals; selecting means for selecting the input of the video camera signals; and wherein at least one of the computer display local television channel generating means and the video device local television channel generating means includes means for including the selected input of the microphone signals and the selected input of the video camera signals in the corresponding computer display local television channel and the video device local television channel.

120.) A home multimedia network according to claim 119; further comprising means for connecting the selected input of the microphone signals to a telephone system.

121.) A home multimedia network according to claim 120; further comprising means for notifying the existence of a received telephone call on at least one display connected to the home multimedia system and means for answering the received telephone call and selecting the input of the microphone signals received by the microphone input.

122.) A home multimedia network according to claim 121; further comprising means for determining a telephone number of a received telephone call; and means for displaying the determined telephone number on said at least one display.

123.) A home multimedia network according to claim 119; further comprising means for connecting to the Internet and downloading Internet data; Internet video output signal generating means for receiving the Internet data and generating an Internet video signal dependent thereon; and wherein the device local channel generating means includes means for generating the video device local television signal containing the Internet video output signal data.

124.) A home multimedia network according to claim 117; further comprising means for connecting the computer to the Internet and downloading Internet data; and wherein the computer display local channel generating means includes means for generating the computer display local television signal containing the Internet video output signal data.

125.) A wirelss display terminal system for use with a multimedia network having a wireless transiever node for receiving and transmitting control signals and video data to wireless devices; the display terminal device characterized by: a housing member; a

display screen held by the housing; computer control signal generating means for generating computer control signals for controlling a remotely located computer; a display driver for driving the display screen in response to a display signal generated by the remotely located computer; and a terminal side wireless transciever disposed within the housing member for transmitting the computer control signals to the remotely located computer as a wireless signal and for receiving the display signal generated by the remotely located computer as a wireless signal.

126.) A wireless display terminal system according to claim 125; wherein the signal generated by the remotely located computer comprises computer display video data; and further including graphic generating means for generating a graphical display receptive by the display driver for displaying graphical information in accordance with simple control signals transmitted by the computer.

127.) A wireless display terminal system according to claim 125; further comprising a touch sensative input device for receiving user input for controlling the generating of the computer control signals.

128.) A wireless dislpay terminal system according to claim 127; wherein the touch sensative input device comprises at least one of a touch screen disposed adjacent to the display screen, a pressure sensative keyboard, a track pad and a track ball.

129.) A wireless display terminal system according to claim 125; wherein the terminal side wireless transceiver comprises at least one transmitter and one receiver selected comprised of an infrared transmitter, an infrared receiever, an ultrasonic transmitter, and ultrasonic receiver, a rf transmitter and an rf receiver.

130.) A wireless display terminal system according to claim 125; further comprising a wireless transciever node connected to a hard wired network having a connection to the remotely located computer, the wireless transciever node including a computer control signal receiver for receiving the wireless signal including the computer control signals from the terminal side wireless transiever and a display signal transmitter for transmitting the display signal generated by the remotely located computer to the terminal side wireless transceiver.

131.) A wireless display terminal system according to claim 125; further comprising a video input device for generating at least one of a video signal and an audio signal; and wherein the terminal display side wireless transceiver includes means for transmitting

the at least one video signaland audio signal to the wireless transceiver node as a wireless signal .

132.) A wireless display terminal system according to claim 125; further comprising a wireless transciever node connected to the computer, the wireless transceiver node including a computer control signal receiver for receiving the wireless signal including the computer control signals from the terminal side wireless transceiver and a display signal transmitter for transmitting the display signal generated by the remotely located computer to the terminal side wireless transceiver.

133.) A wireless display terminal system according to claim 125; further comprising a video input device for generating at least one of a video signal and an audio signal; and wherein the terminal display side wireless transceiver includes means for transmitting the at least one video signal and audio signal to the wireless transceiver node as a wireless signal .

134.) A wireless display terminal system according to claim 125; further comprising device remote control signal generating means for generating remote control signals effective for controlling appliances receptive of such control signals.

135.) A wireless display terminal system comprising: a housing member; a display screen held by the housing; control signal generating means for generating control signals for controlling at least one remotely located data source; a first wireless data signal receiving means for receiving a first wireless data signal; a second wireless signal receiving means for receiving a second wireless data signal; video processing means for processing video information contained in the first and the second wireless data signal, the video processing means being effective for outputting a composed video signal containing a screen image composed of a split screen or picture-in-a-picture display comprised of the video information; display driving means for receiving the composed

video signal and outputting a display driving signal; and a display for receiving the display driving signal and displaying the screen image.

136.) A wireless display terminal according to claim 135; further comprising a touch sensative input device for receiving user input for controlling the generating of the computer control signals.

137.) A wireless display terminal system according to claim 135; further comprising a wireless transceiver node connected to a hard wired network in communication with a remotely located computer.

138.) A wireless display terminal according to claim 135; further comprising a video input device for generating at least one of a video signal and an audio signal; and means for transmitting the at least one video signal and audio signal as a wireless signal.

139

~~138.~~) A wireless display terminal system according to claim 135; further comprising remote control signal generating means for generating remote control signals effective for controlling computers and appliances receptive of such control signals.

140.) An antenna node device, characterized by: an antenna for receiving a wireless signal; first conditioning means for conditioning the wireless signal into a wired medium transmission signal for effective transmission over a wired network; connecting means for connecting the conditioning means to the wired network, whereby the received wireless signal is converted into the wired medium transmission signal and injected onto the wired network.

141.) An antenna node device according to claim 140, further comprising; means for receiving a wired medium transmission signal from a wired network; second conditioning means for conditioning the received wired medium transmission signal into a wireless signal effective for wireless transmission; and emitting means for emitting the wireless signal, whereby the received wired medium transmission signal is converted into the wireless signal and emitted for reception by a remote wireless device.

142.) An antenna node device according to claim 140; wherein the first conditioning means comprising an down-converter and the second conditioning means comprises a up-converter.

143.) An antenna node according to claim 142; wherein the up-converter is effective for converting a received 900 MHz band signal to a 2.4 Ghz band signal; and the down-converter is effective for converting a received 2.4 Ghz band signal to a 900 Mhz band signal.

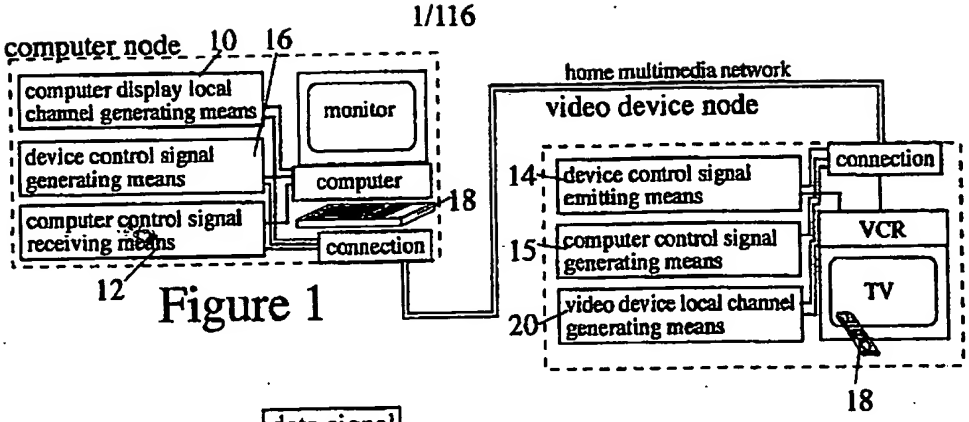


Figure 1

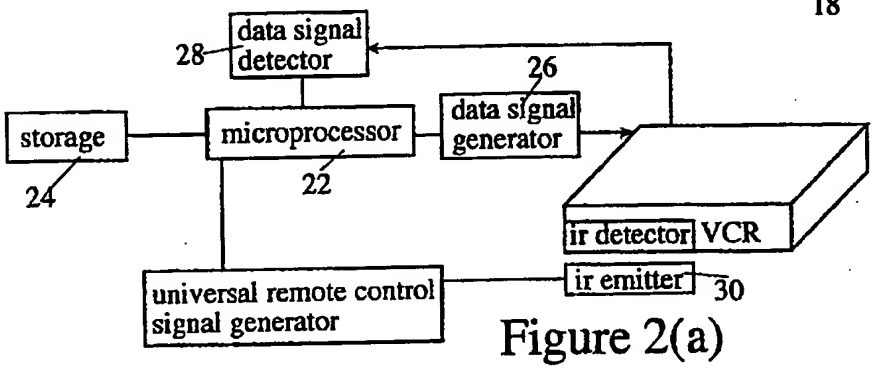


Figure 2(a)

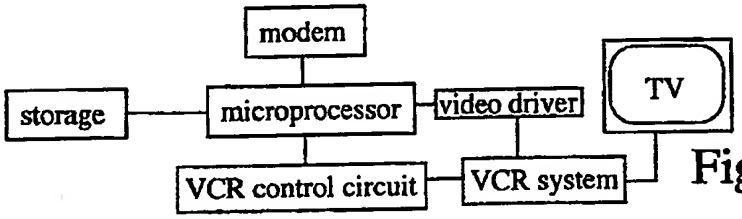


Figure 2(b)

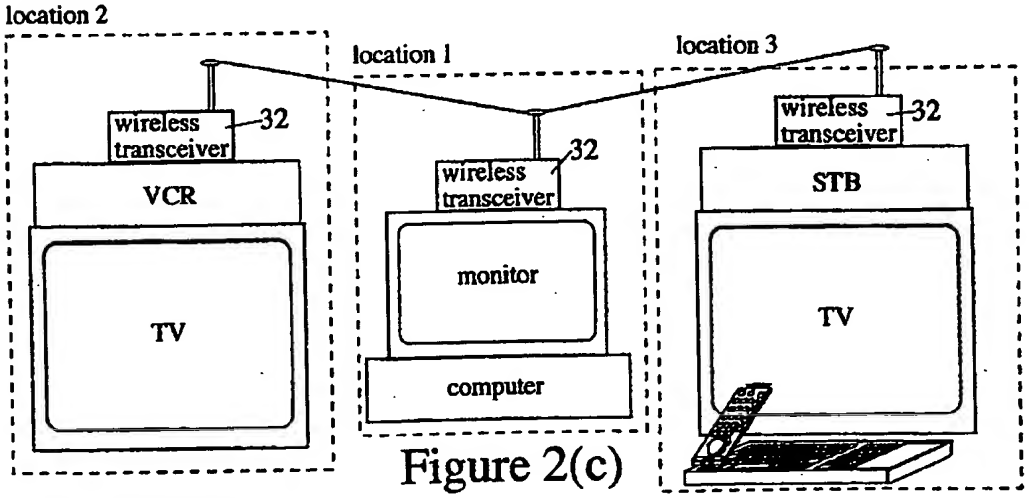


Figure 2(c)

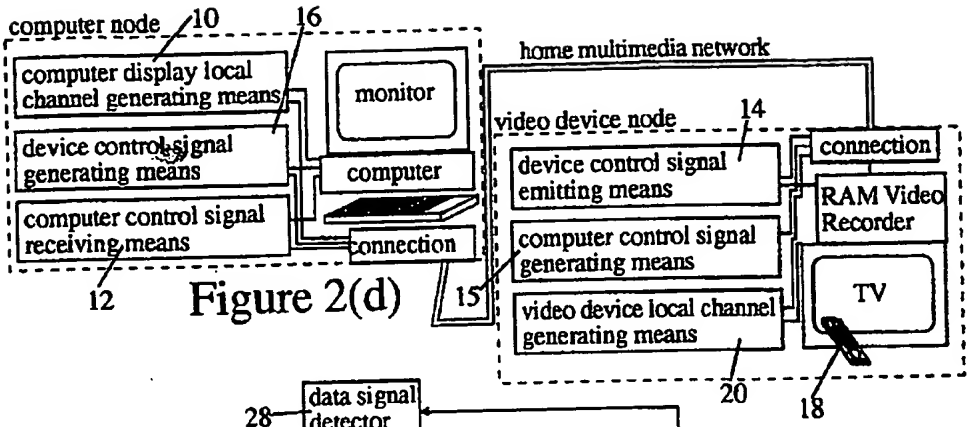


Figure 2(d)

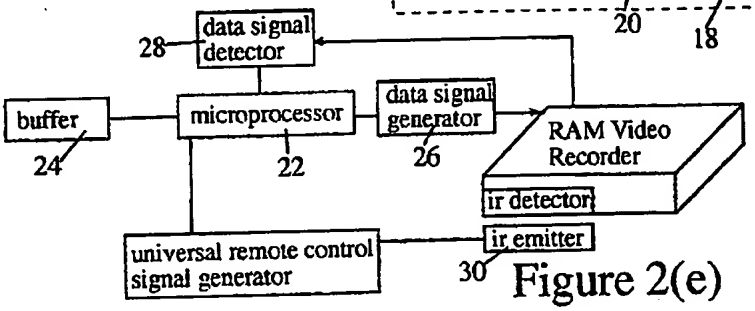


Figure 2(e)

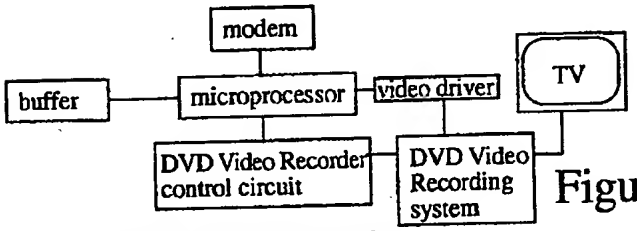


Figure 2(f)

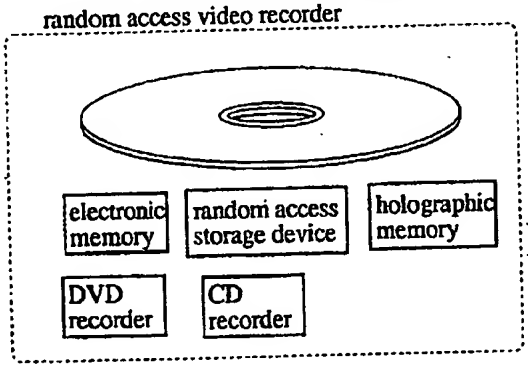


Figure 2(g)

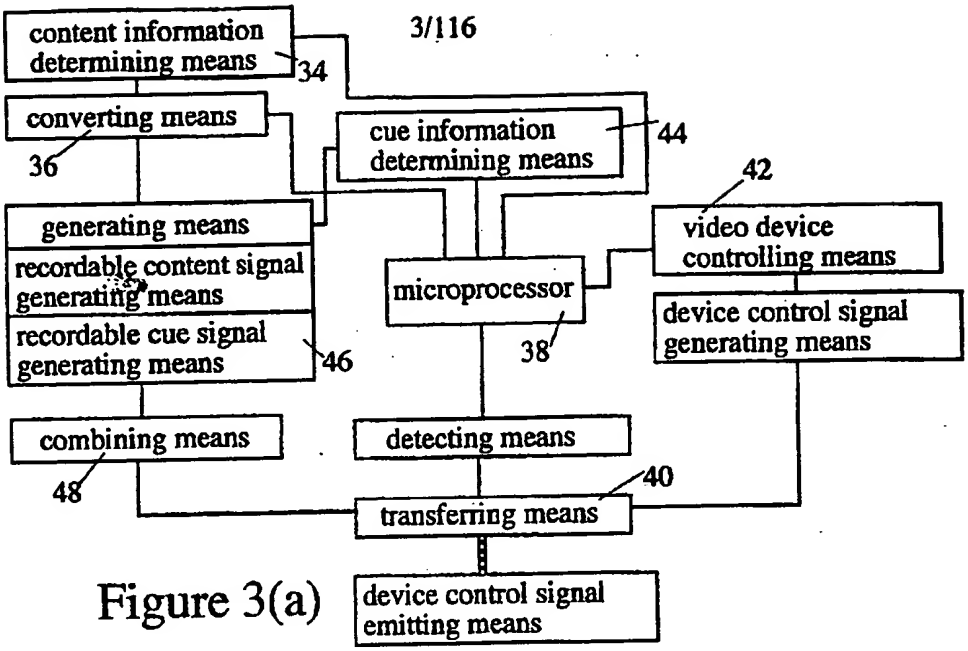


Figure 3(a)

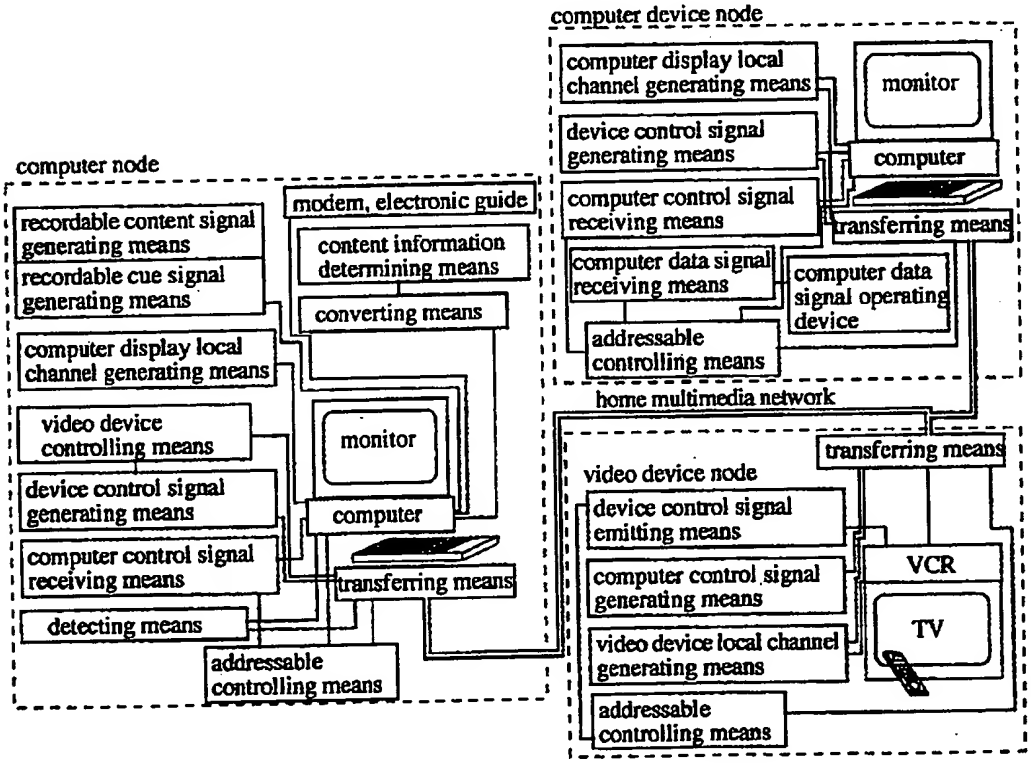


Figure 3(b)

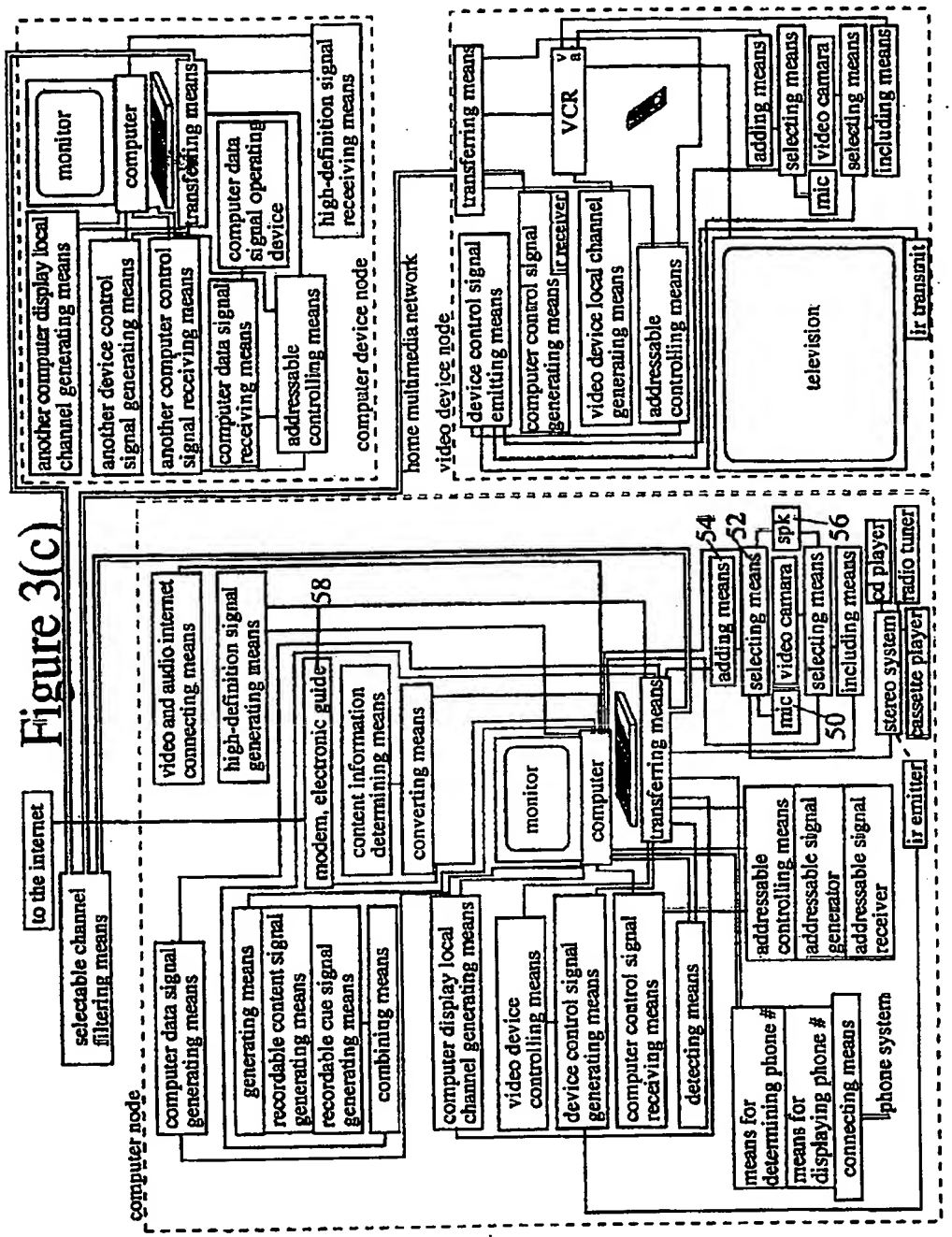


Figure 3(c)
to the internet
selectable channel filtering means
computer node
computer data signal generating means
generating means
recordable content signal generating means
recordable cue signal generating means
combining means
video and audio internet connecting means
high-definition signal generating means
modem, electronic guide
58
content information determining means
converting means
computer display local channel generating means
video device controlling means
device control signal generating means
computer control signal receiving means
detecting means
monitor
computer
transferring means
means for determining phone #
means for displaying phone #
connecting means
phone system
addressable controlling means
addressable signal generator
addressable signal receiver
ir emitter
54
52
adding means
selecting means
mic
video camara
spk
50
selecting means
including means
56
stereo system
cd player
passette player
radio tuner
ir transmit
television
another computer display local channel generating means
another device control signal generating means
another computer control signal receiving means
computer data signal receiving means
computer data signal operating device
addressable controlling means
computer device node
high-definition signal receiving means
monitor
computer
transferring means
home multimedia network
video device node
device control signal emitting means
computer control signal generating means
ir receiver
video device local channel generating means
addressable controlling means
transferring means
VCR
adding means
selecting means
mic
video camara
selecting means
including means

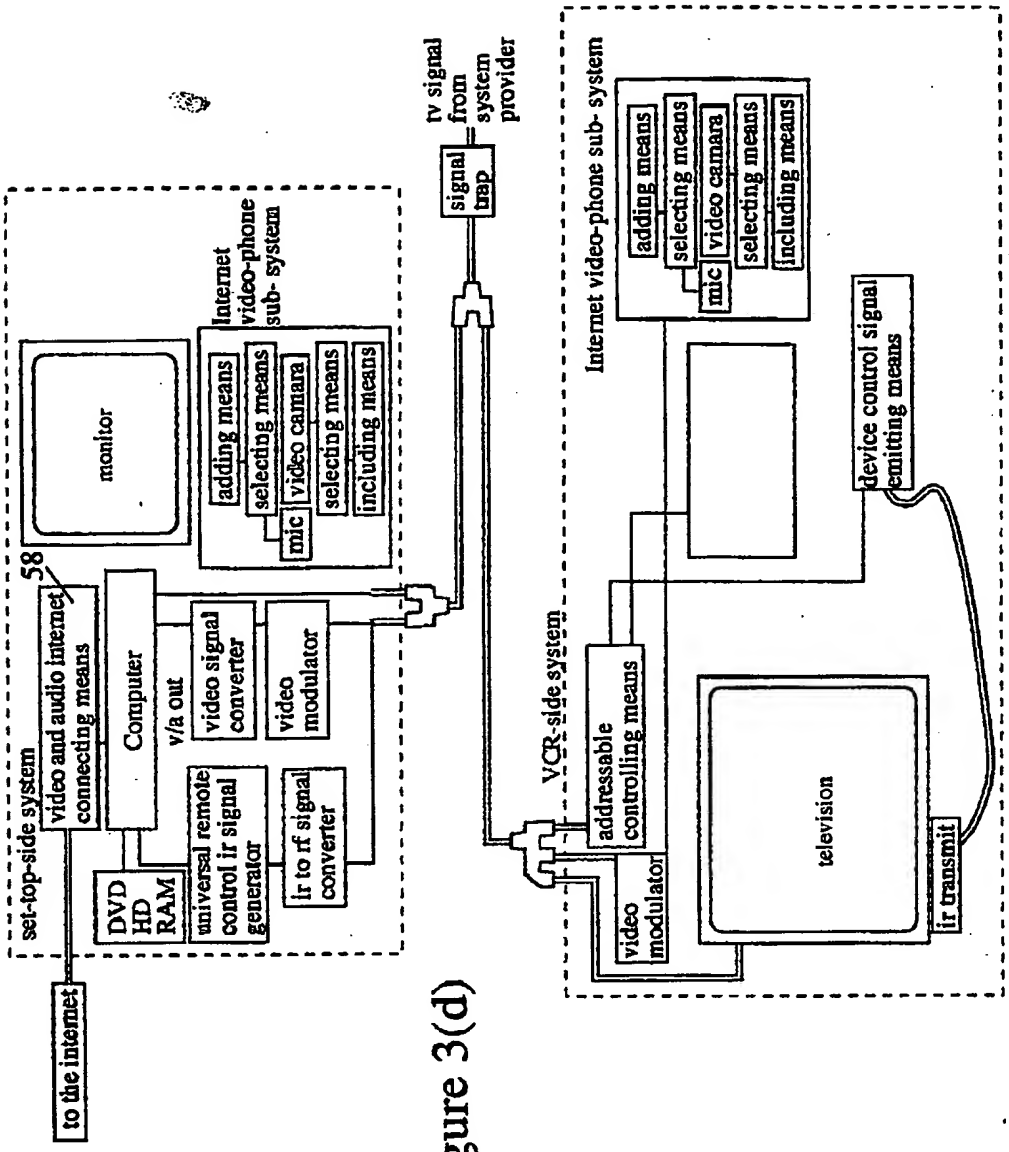

set-top-side system
video and audio internet connecting means
58
Computer
v/a out
video signal converter
video modulator
monitor
Internet video-phone sub- system
adding means
selecting means
video camara
mic
selecting means
including means
universal remote control ir signal generator
ir to rf signal converter
DVD HD RAM
to the internet
tv signal from system provider
signal map
VCR-side system
addressable controlling means
video modulator
Internet video-phone sub- system
adding means
selecting means
video camara
mic
selecting means
including means
device control signal emitting means
television
ir transmit

Figure 3(d)

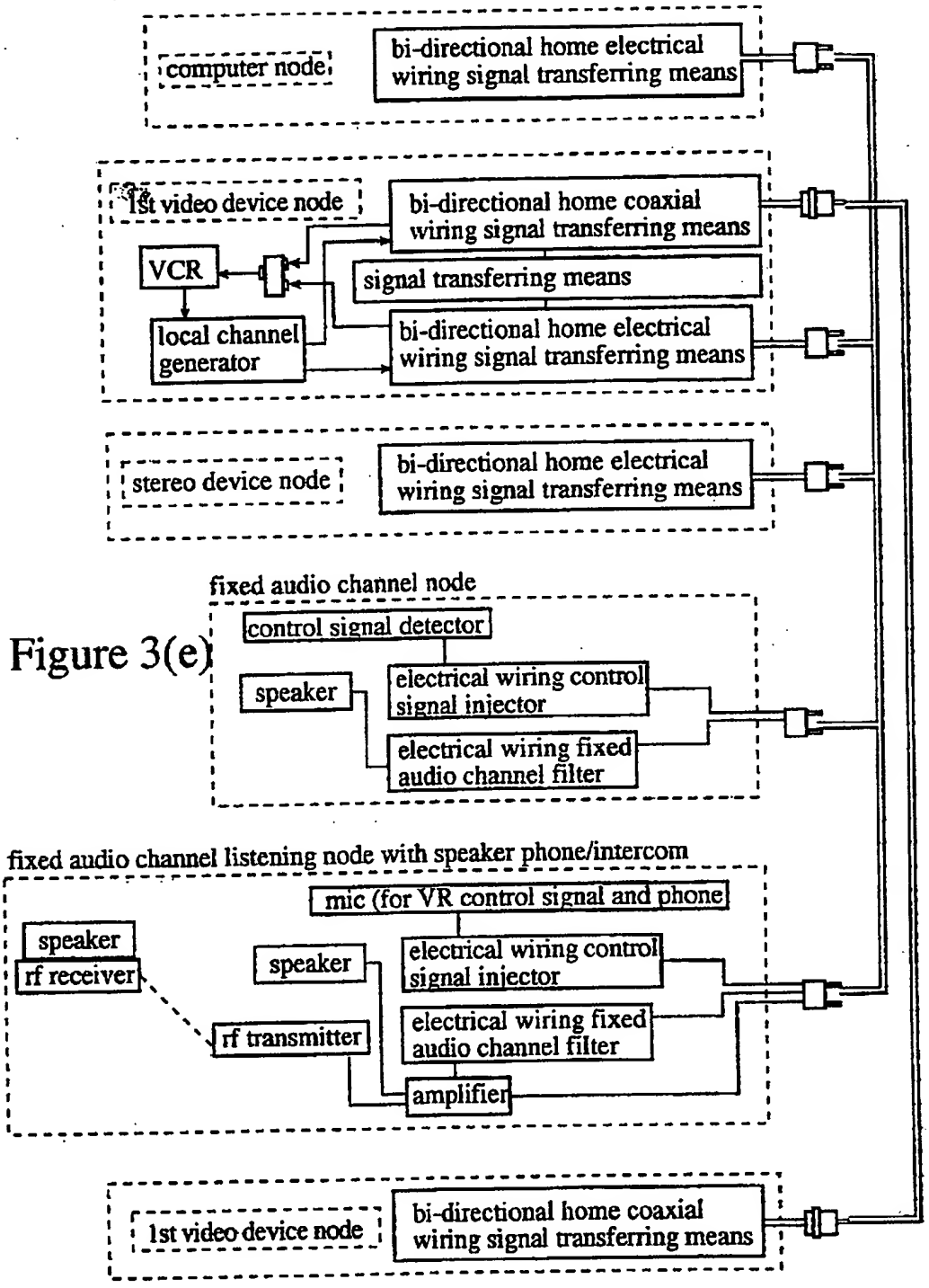

computer node
bi-directional home electrical wiring signal transferring means
1st video device node
bi-directional home coaxial wiring signal transferring means
VCR
signal transferring means
local channel generator
bi-directional home electrical wiring signal transferring means
stereo device node
bi-directional home electrical wiring signal transferring means
fixed audio channel node
control signal detector
speaker
electrical wiring control signal injector
electrical wiring fixed audio channel filter
fixed audio channel listening node with speaker phone/intercom
mic (for VR control signal and phone
speaker
rf receiver
speaker
electrical wiring control signal injector
rf transmitter
electrical wiring fixed audio channel filter
amplifier
1st video device node
bi-directional home coaxial wiring signal transferring means

Figure 3(e)

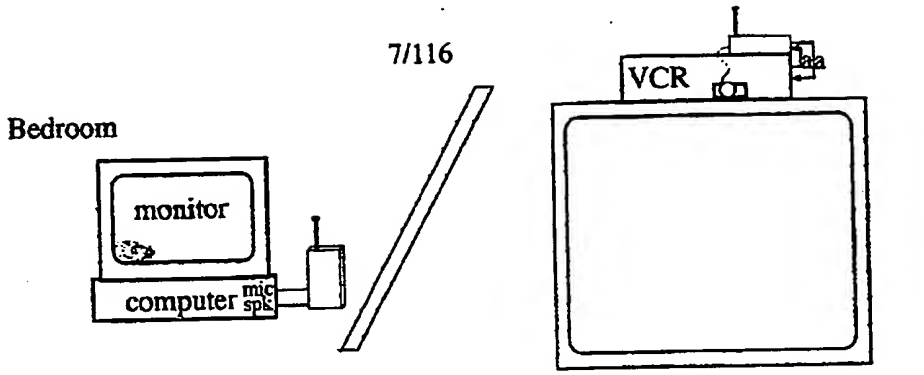
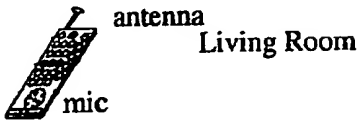


Figure 3(f)



button1	frequency1	pulse train1	stop
button2	frequency2	pulse train2	play
button3	frequency3	pulse train3	record
button4	frequency4	pulse train4	pause
button5	frequency5	pulse train5	fast forward
button6	frequency6	pulse train6	channel up
button7	frequency7	pulse train7	channel down
button8	frequency8	pulse train8	
button9	frequency9	pulse train9	
button1	frequency10	pulse train10	
button11	frequency11	pulse train11	
button12	frequency12	pulse train12	

Figure 3(g)
example
vcr and tv
controls

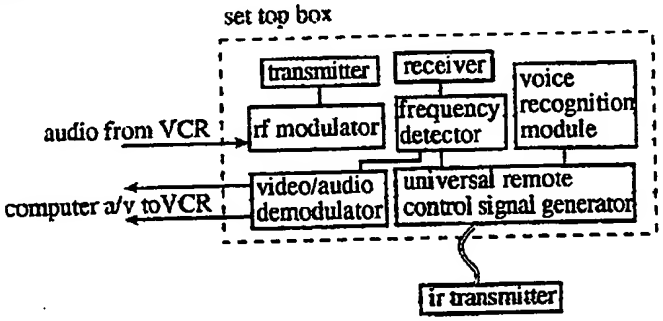
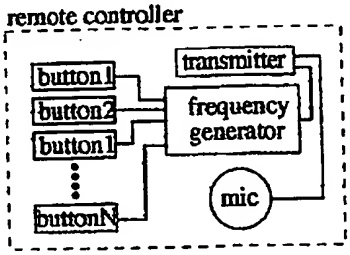


Figure 3(h)



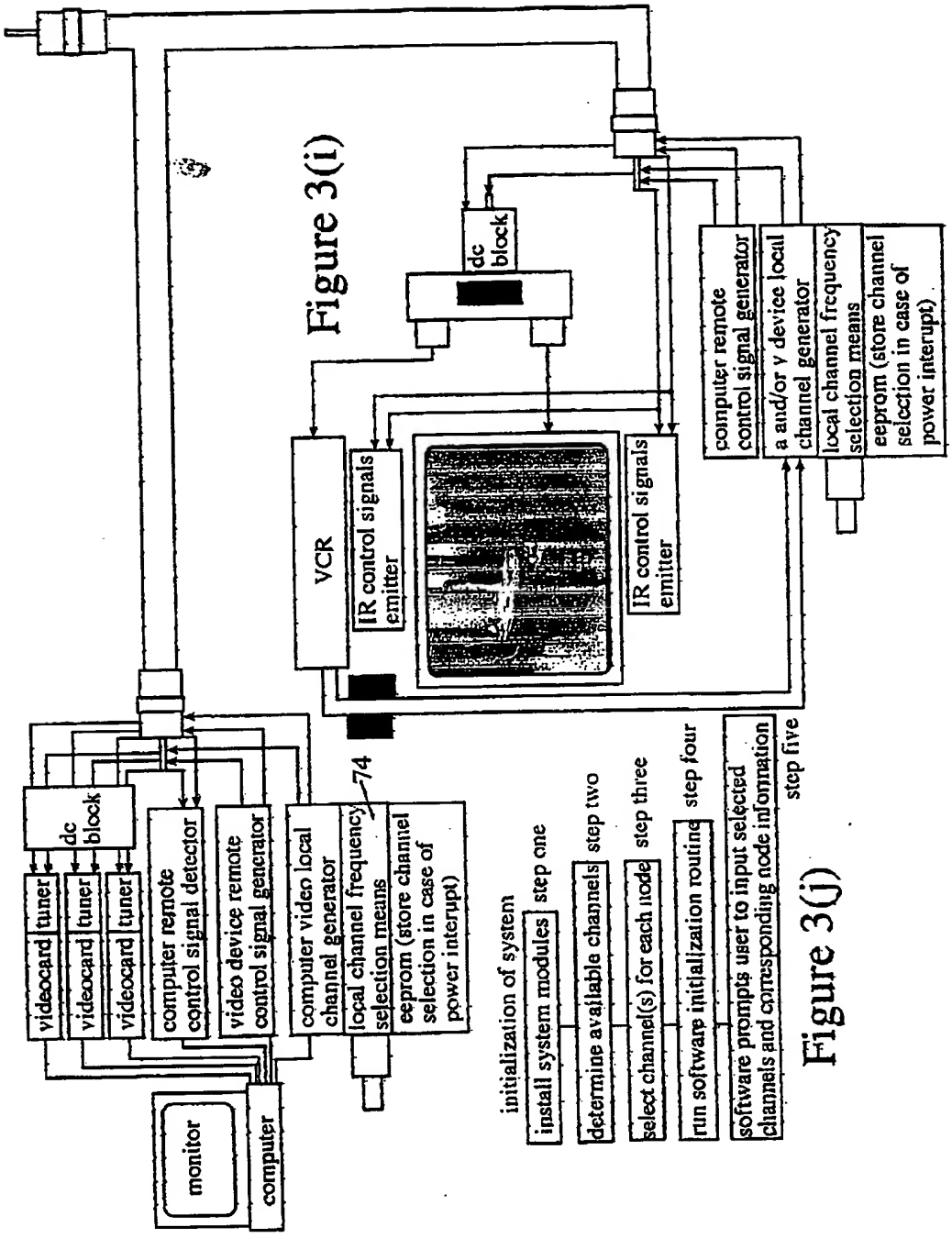
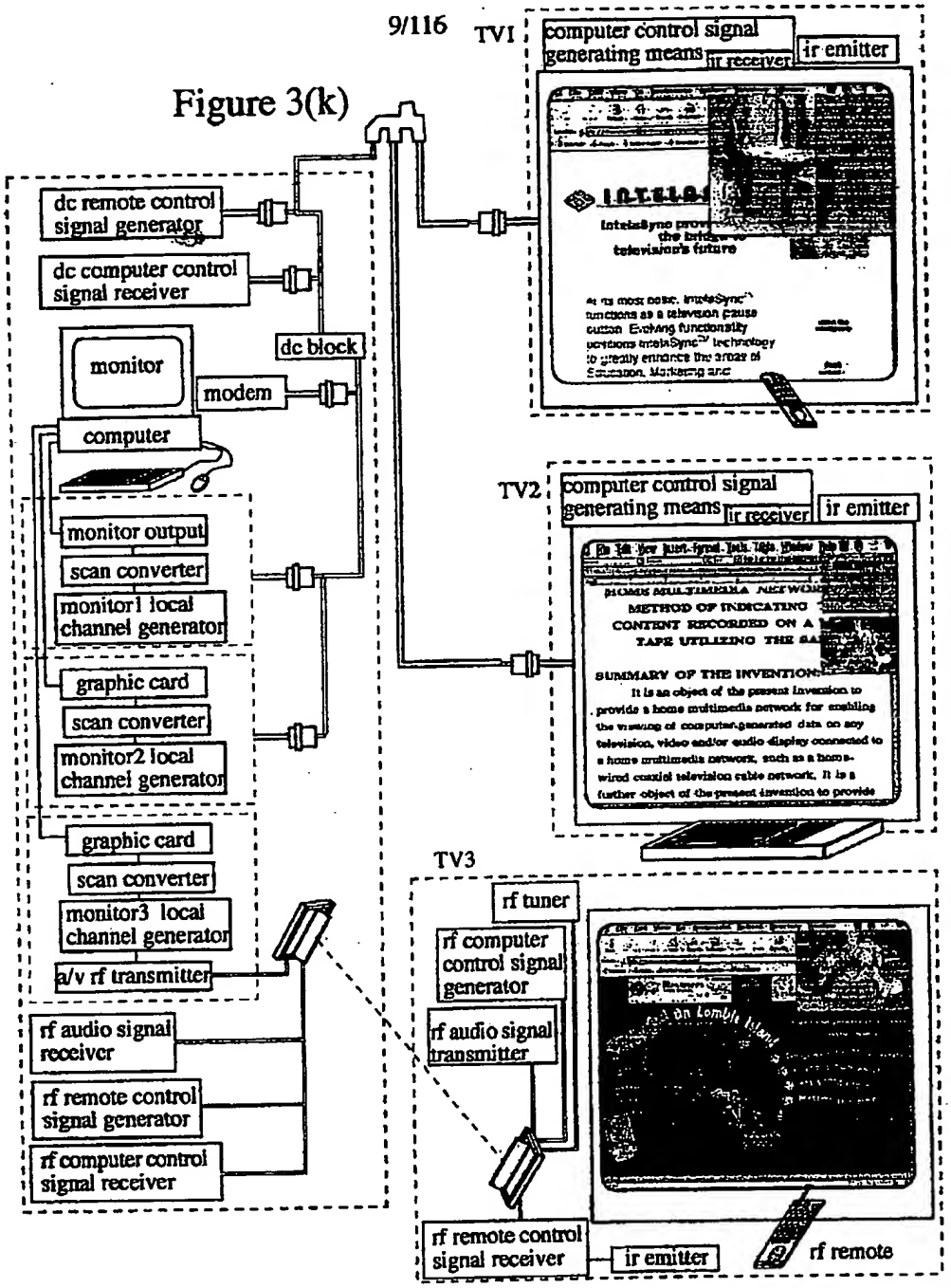


Figure 3(i)
VCR
IR control signals emitter
IR control signals emitter
dc block
dc block
computer remote control signal generator
a and/or v device local channel generator
local channel frequency selection means
eeprom (store channel selection in case of power interupt)
videocard tuner
videocard tuner
videocard tuner
computer remote control signal detector
video device remote control signal generator
computer video local channel generator
local channel frequency selection means
eeprom (store channel selection in case of power interupt)
74
monitor
computer
initialization of system
install system modules
step one
determine available channels
step two
select channel(s) for each node
step three
run software initialization routine
step four
software prompts user to input selected channels and corresponding node information
step five

Figure 3(j)

Figure 3(k)


TV1
computer control signal generating means
ir receiver
ir emitter
dc remote control signal generator
dc computer control signal receiver
dc block
monitor
modem
computer
monitor output
scan converter
monitor1 local channel generator
graphic card
scan converter
monitor2 local channel generator
graphic card
scan converter
monitor3 local channel generator
a/v rf transmitter
rf audio signal receiver
rf remote control signal generator
rf computer control signal receiver
TV2
computer control signal generating means
ir receiver
ir emitter
METHOD OF INDICATING
CONTENT RECORDED ON A
TAPE UTILIZING THE SA
SUMMARY OF THE INVENTION
TV3
rf tuner
rf computer control signal generator
rf audio signal transmitter
rf remote control signal receiver
ir emitter
rf remote

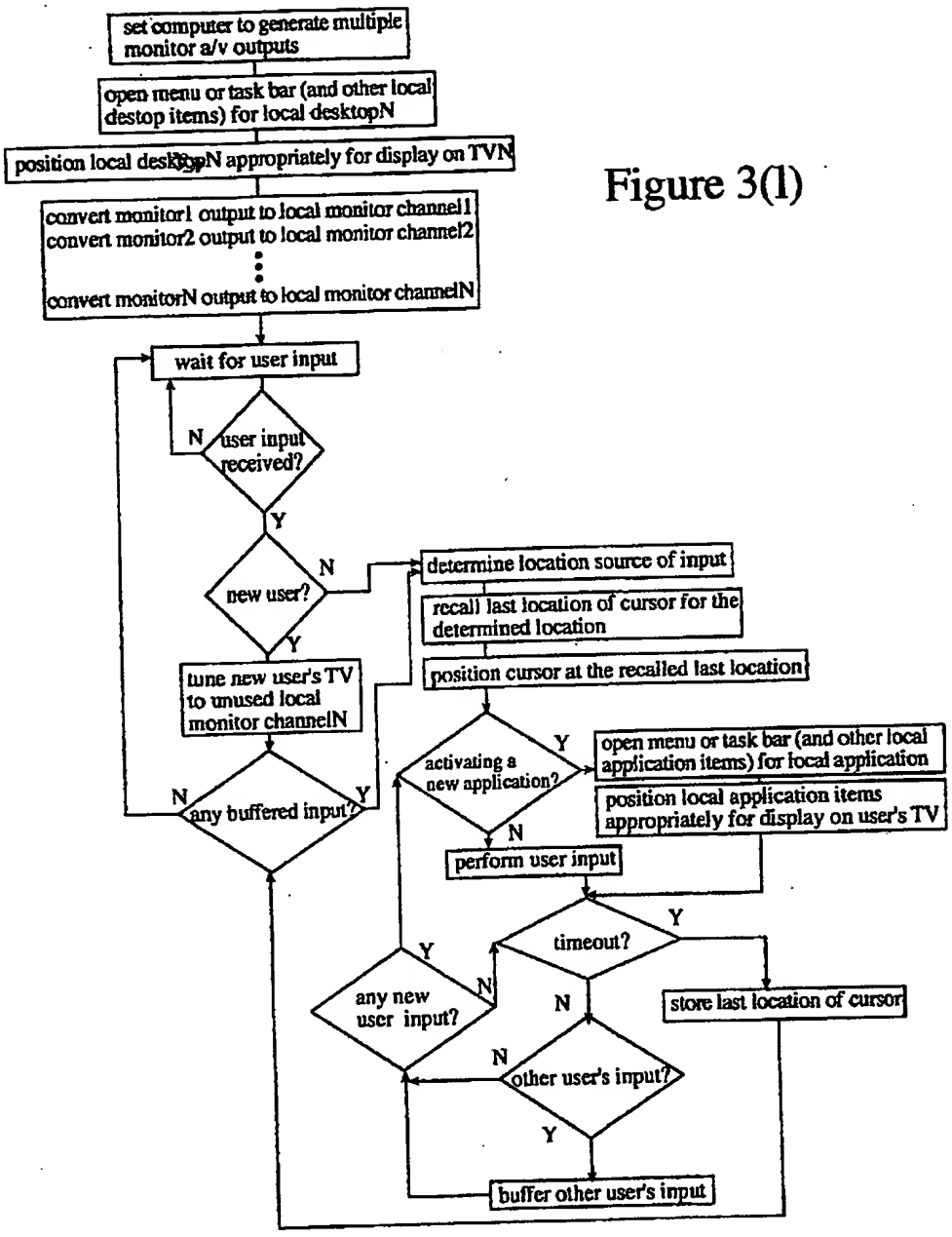

set computer to generate multiple monitor a/v outputs
open menu or task bar (and other local destop items) for local desktopN
position local desktopN appropriately for display on TVN
convert monitor1 output to local monitor channel1
convert monitor2 output to local monitor channel2
convert monitorN output to local monitor channelN
wait for user input
user input received?
N
Y
new user?
N
Y
tune new user's TV to unused local monitor channelN
any buffered input?
N
Y
determine location source of input
recall last location of cursor for the determined location
position cursor at the recalled last location
activating a new application?
Y
N
open menu or task bar (and other local application items) for local application
position local application items appropriately for display on user's TV
perform user input
timeout?
Y
N
store last location of cursor
any new user input?
Y
N
other user's input?
N
Y
buffer other user's input

Figure 3(1)

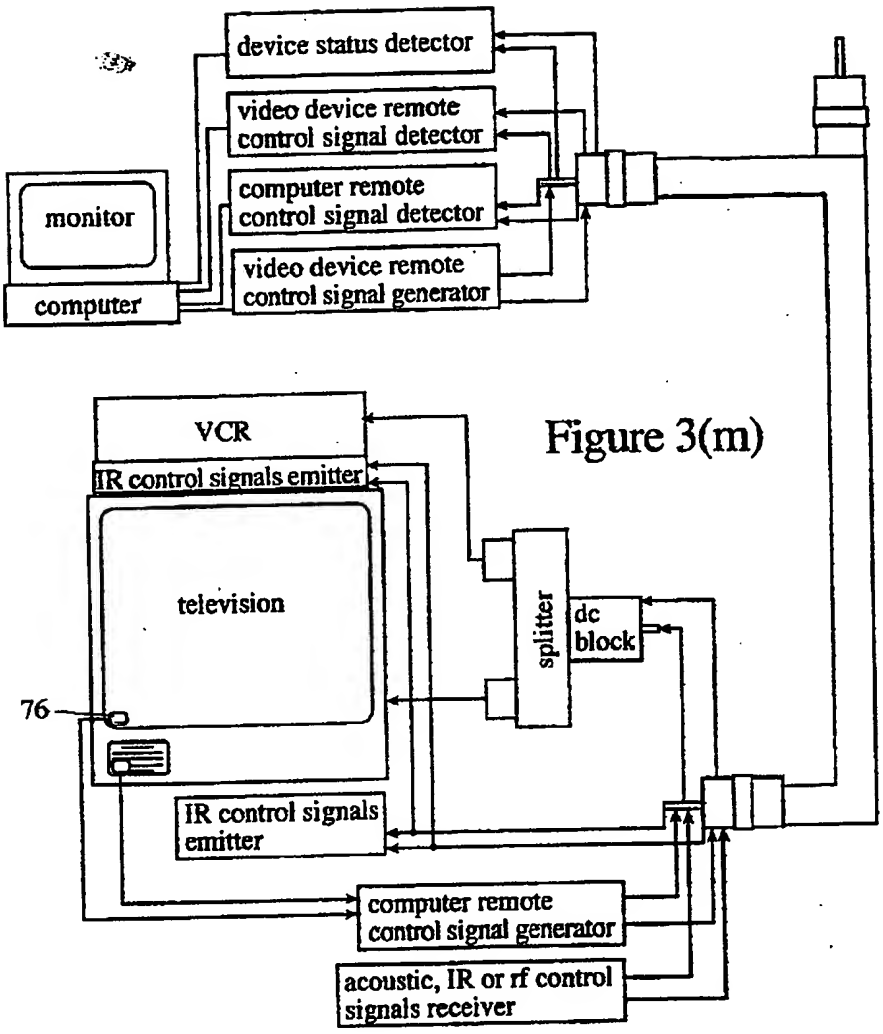

device status detector
video device remote control signal detector
computer remote control signal detector
video device remote control signal generator
monitor
computer
VCR
IR control signals emitter
television
76
splitter
dc block
IR control signals emitter
computer remote control signal generator
acoustic, IR or rf control signals receiver

Figure 3(m)

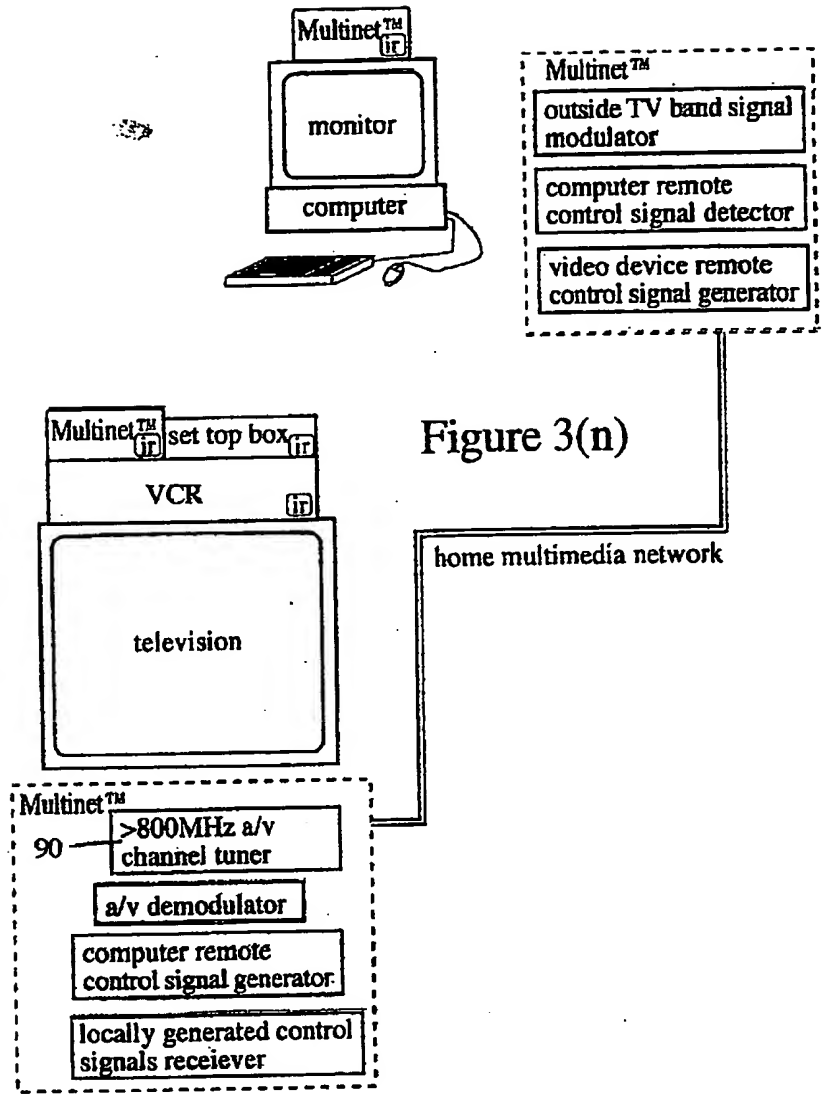

Multinet™
monitor
computer
Multinet™
outside TV band signal modulator
computer remote control signal detector
video device remote control signal generator
Multinet™ set top box
VCR
television
home multimedia network
Multinet™
90
>800MHz a/v channel tuner
a/v demodulator
computer remote control signal generator
locally generated control signals receiever

Figure 3(n)

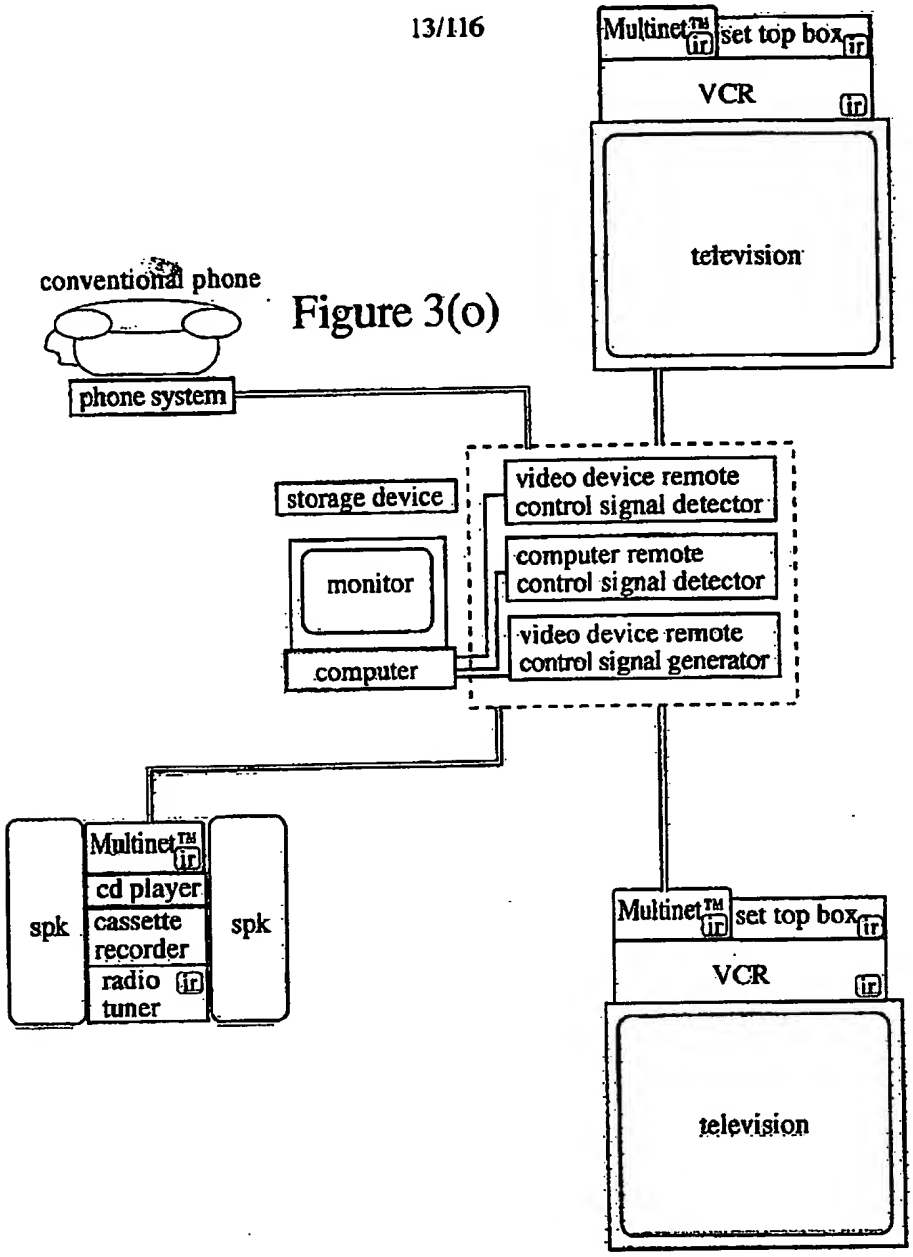

Multinet™ ir set top box ir
VCR ir
television
conventional phone
phone system
storage device
monitor
computer
video device remote control signal detector
computer remote control signal detector
video device remote control signal generator
spk
Multinet™ ir
cd player
cassette recorder
radio ir tuner
spk
Multinet™ ir set top box ir
VCR ir
television

Figure 3(o)

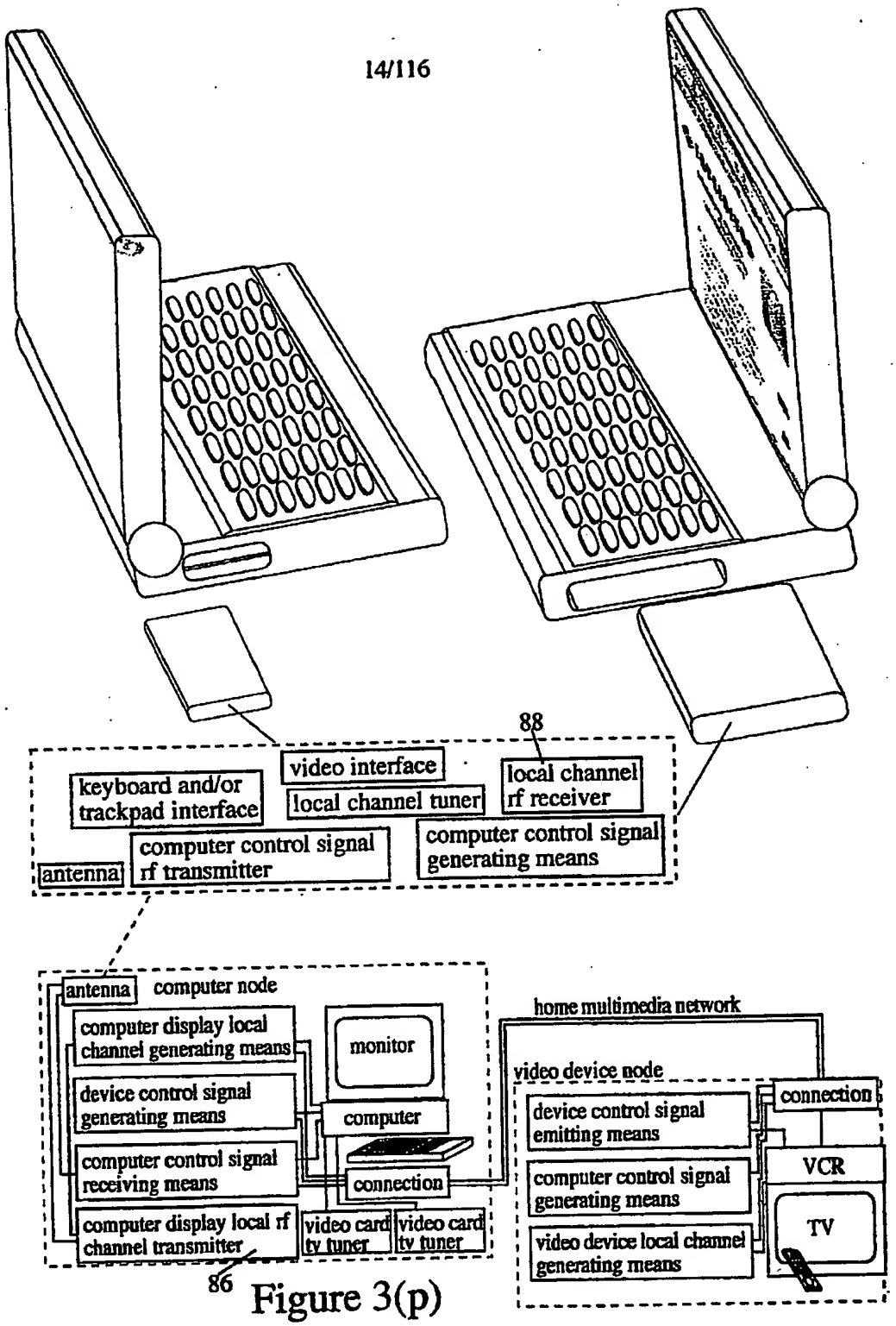

88
video interface
keyboard and/or trackpad interface
local channel tuner
local channel rf receiver
computer control signal rf transmitter
computer control signal generating means
antenna
antenna
computer node
computer display local channel generating means
monitor
device control signal generating means
computer
computer control signal receiving means
connection
computer display local rf channel transmitter
video card tv tuner
video card tv tuner
86
home multimedia network
video device node
connection
device control signal emitting means
VCR
computer control signal generating means
TV
video device local channel generating means

Figure 3(p)

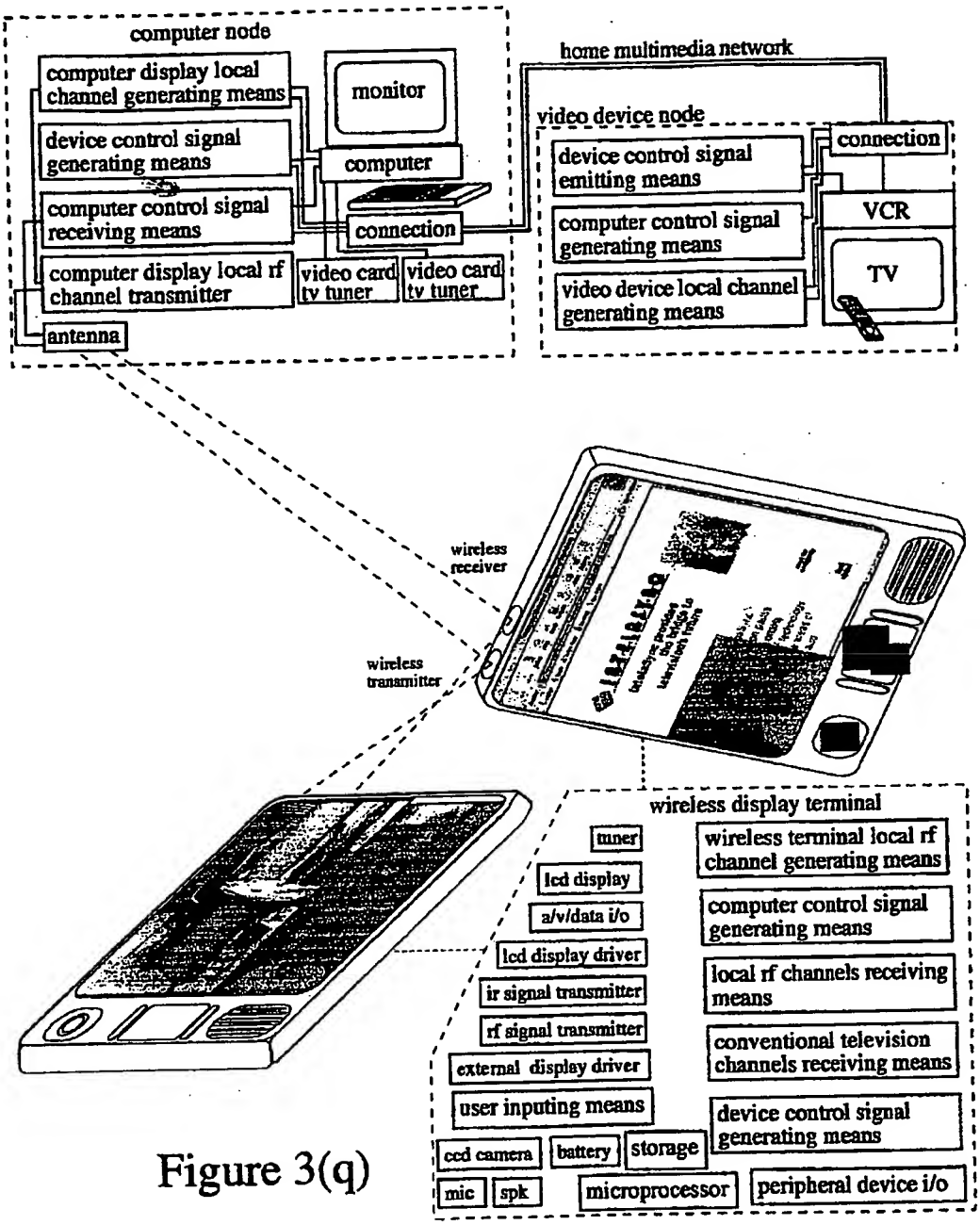

computer node
computer display local channel generating means
monitor
device control signal generating means
computer
computer control signal receiving means
connection
computer display local rf channel transmitter
video card tv tuner
video card tv tuner
antenna
home multimedia network
video device node
device control signal emitting means
connection
computer control signal generating means
VCR
video device local channel generating means
TV
wireless receiver
wireless tranamitter
wireless display terminal
tuner
lcd display
a/v/data i/o
lcd display driver
ir signal transmitter
rf signal transmitter
external display driver
user inputing means
ccd camera
battery
storage
mic
spk
microprocessor
peripheral device i/o
wireless terminal local rf channel generating means
computer control signal generating means
local rf channels receiving means
conventional television channels receiving means
device control signal generating means

Figure 3(q)

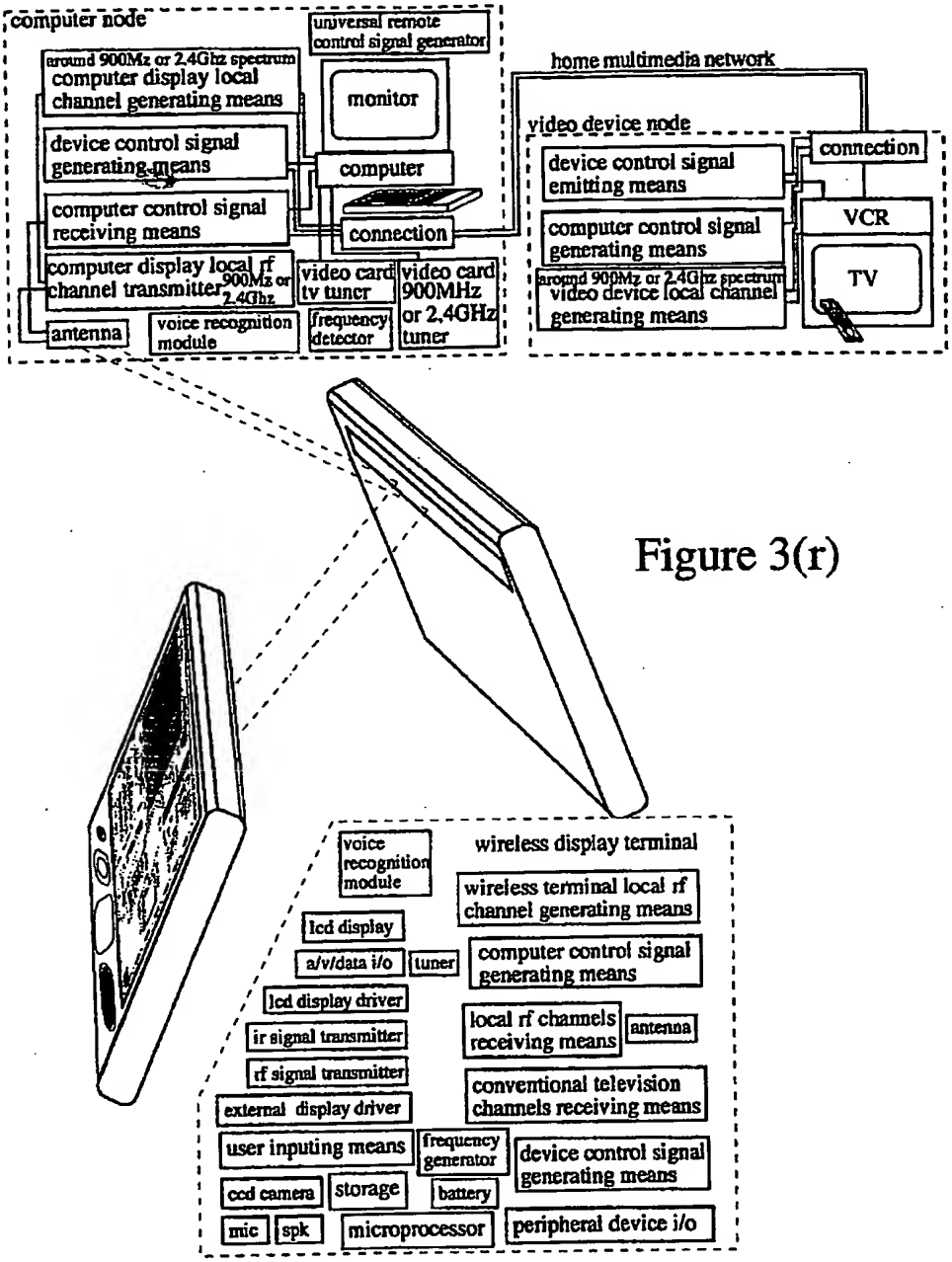

computer node
universal remote control signal generator
around 900Mz or 2.4Ghz spectrum computer display local channel generating means
monitor
device control signal generating means
computer
computer control signal receiving means
connection
computer display local rf channel transmitter 900Mz or 2.4Ghz
video card tv tuner
video card 900MHz or 2.4GHz tuner
antenna
voice recognition module
frequency detector
home multimedia network
video device node
device control signal emitting means
connection
computer control signal generating means
VCR
around 900Mz or 2.4Ghz spectrum video device local channel generating means
TV
voice recognition module
wireless display terminal
wireless terminal local rf channel generating means
lcd display
a/v/data i/o
tuner
computer control signal generating means
lcd display driver
ir signal transmitter
local rf channels receiving means
antenna
rf signal transmitter
external display driver
conventional television channels receiving means
user inputing means
frequency generator
device control signal generating means
ccd camera
storage
battery
mic
spk
microprocessor
peripheral device i/o

Figure 3(r)

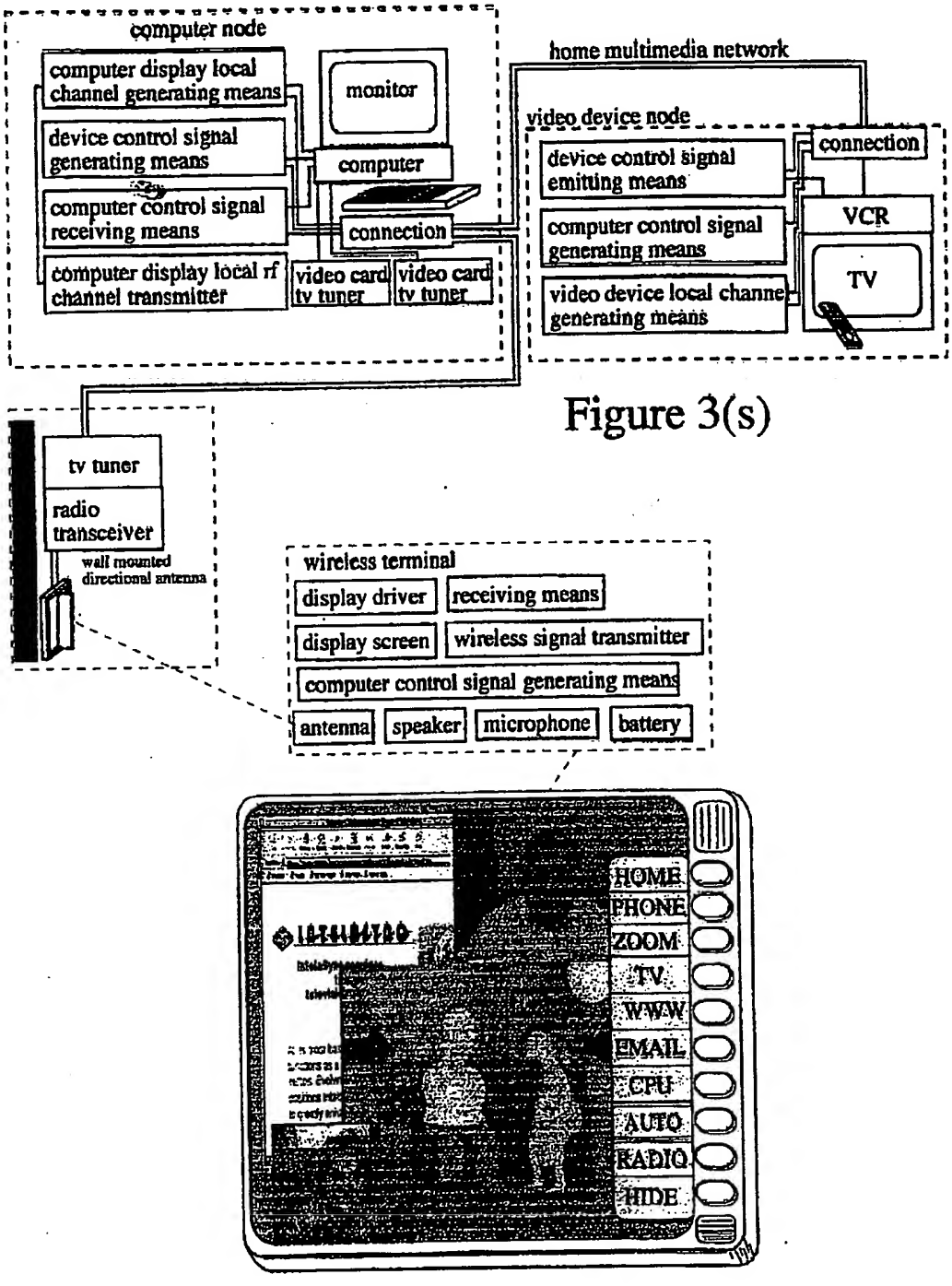

computer node
computer display local channel generating means
monitor
device control signal generating means
computer
computer control signal receiving means
connection
computer display local rf channel transmitter
video card tv tuner
video card tv tuner
home multimedia network
video device node
device control signal emitting means
connection
VCR
computer control signal generating means
TV
video device local channe generating means
tv tuner
radio transceiver
wall mounted directional antenna
wireless terminal
display driver
receiving means
display screen
wireless signal transmitter
computer control signal generating means
antenna
speaker
microphone
battery
HOME
PHONE
ZOOM
TV
WWW
EMAIL
CPU
AUTO
RADIO
HIDE

Figure 3(s)

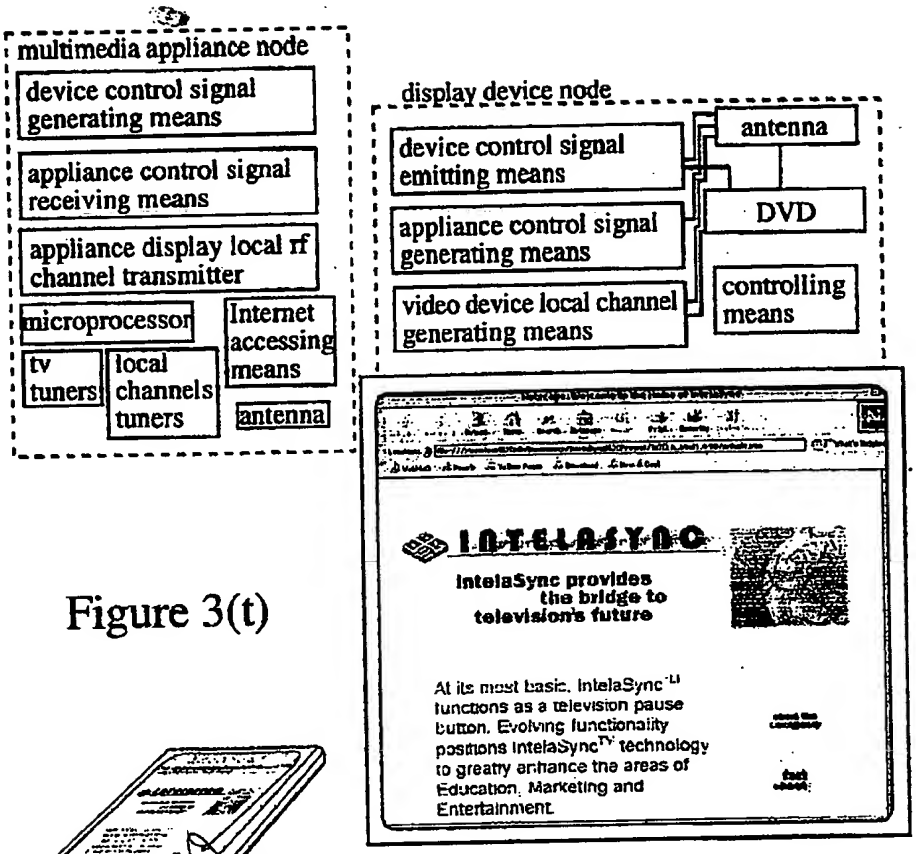
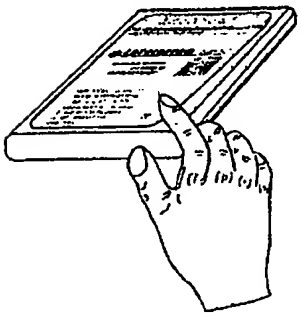

multimedia appliance node
device control signal generating means
appliance control signal receiving means
appliance display local rf channel transmitter
microprocessor
Internet accessing means
tv tuners
local channels tuners
antenna
display device node
device control signal emitting means
appliance control signal generating means
video device local channel generating means
antenna
DVD
controlling means
INTELASYNC
IntelaSync provides the bridge to television's future
At its most basic, IntelaSync™ functions as a television pause button. Evolving functionality positions IntelaSync™ technology to greatly enhance the areas of Education, Marketing and Entertainment.

Figure 3(t)



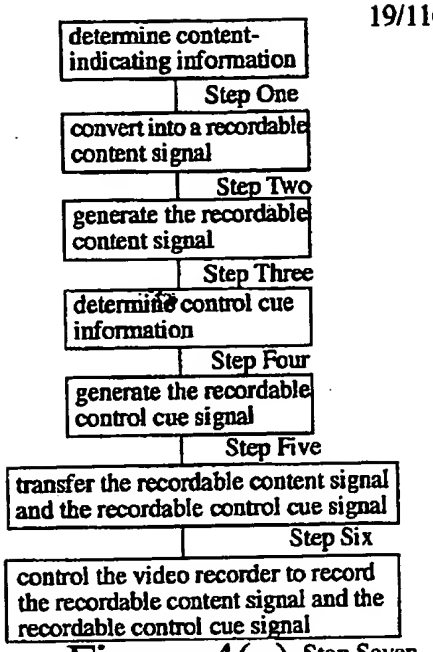


Figure 4(a)

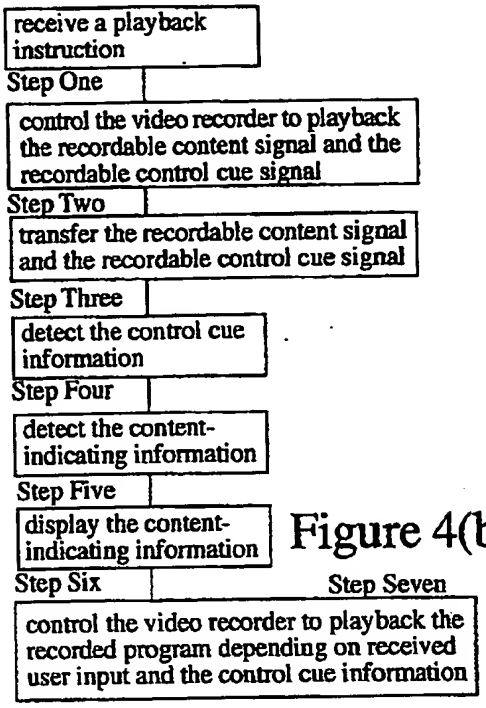


Figure 4(b)

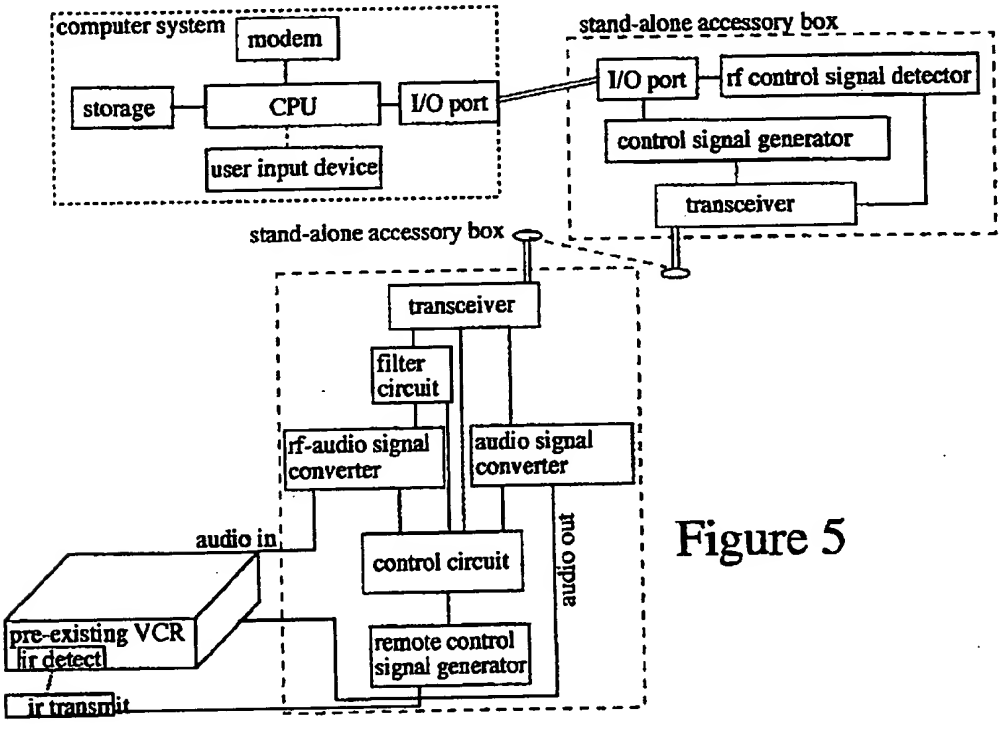


Figure 5

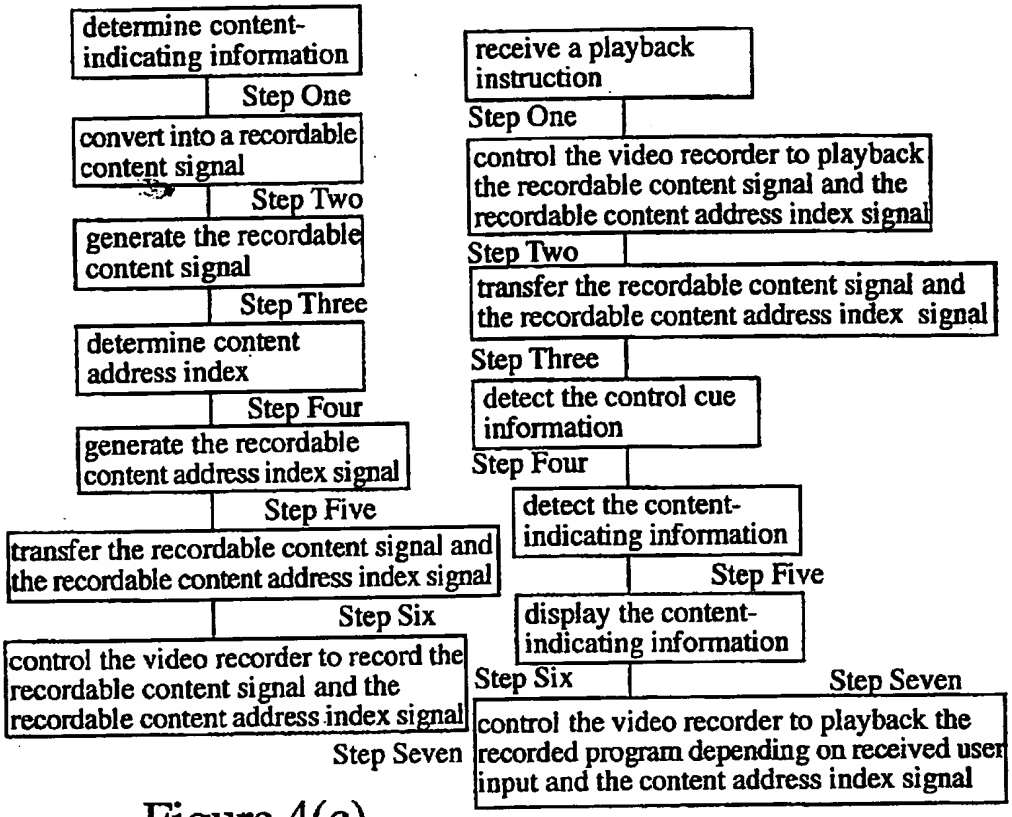


Figure 4(c)

Figure 4(d)

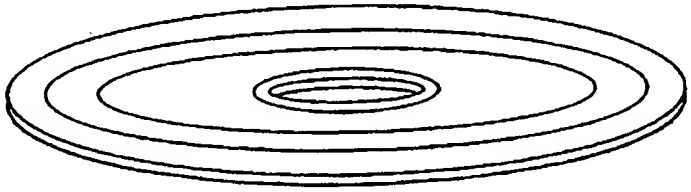


Figure 4(e)

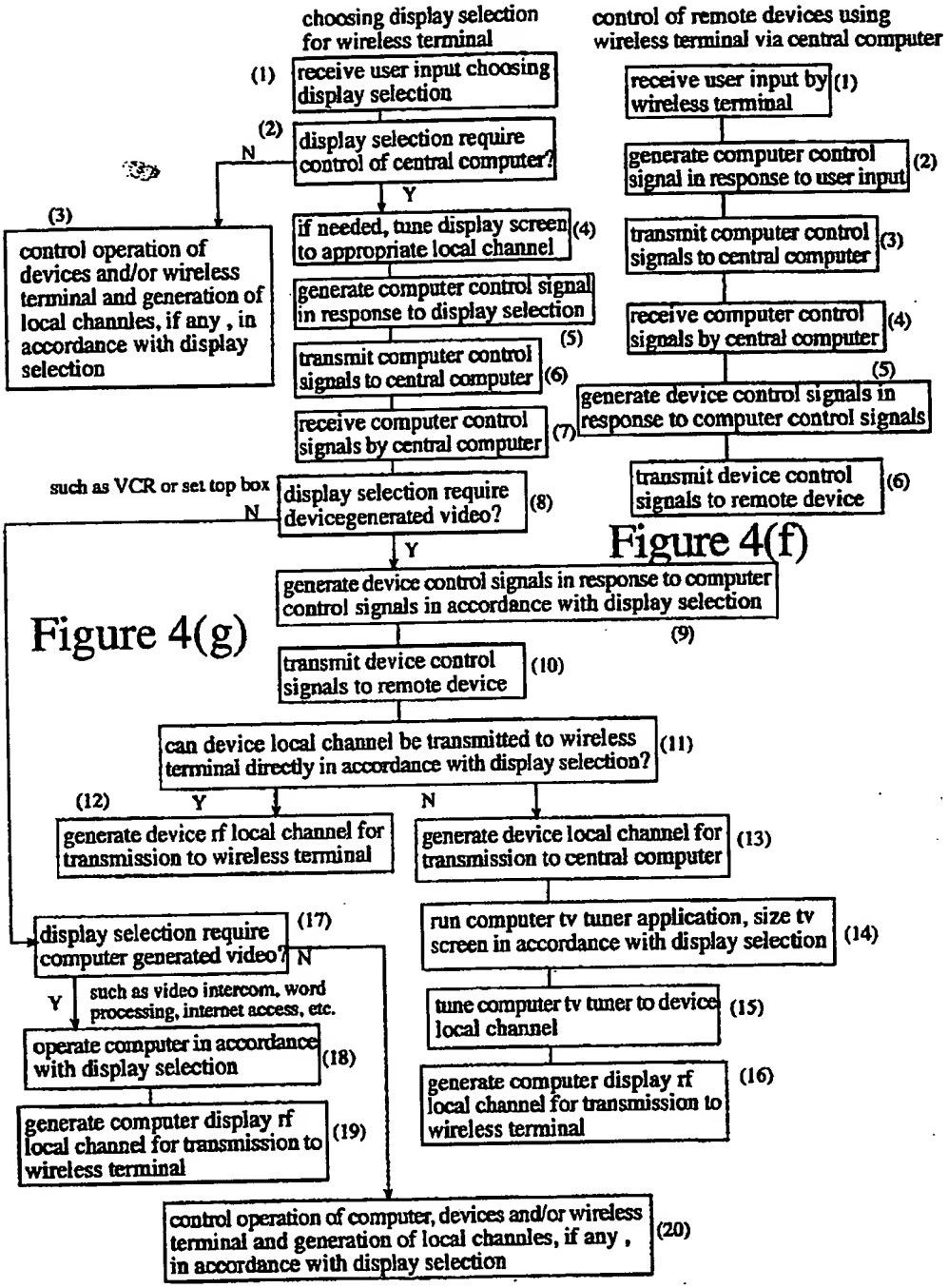


Figure 4(f)

Figure 4(g)

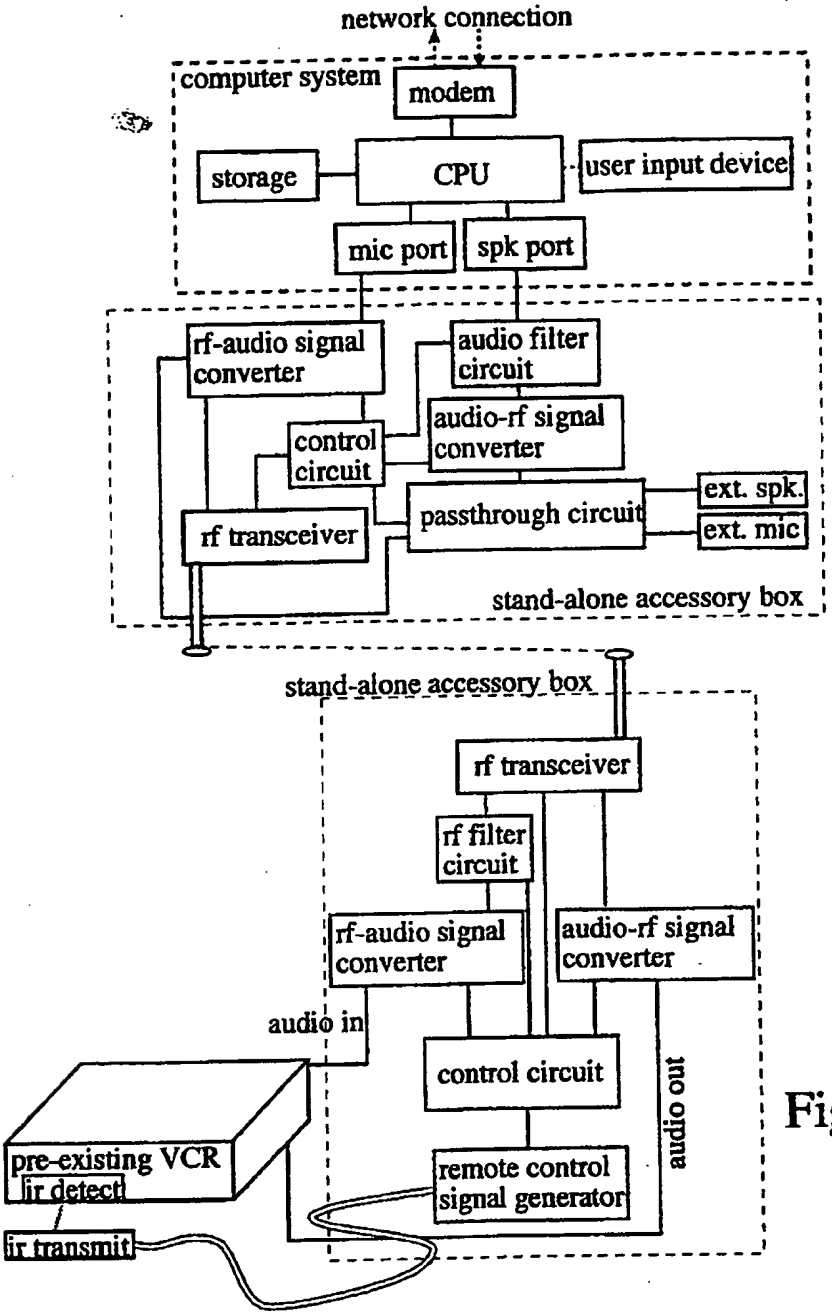

network connection
computer system
modem
storage
CPU
user input device
mic port
spk port
rf-audio signal converter
audio filter circuit
audio-rf signal converter
control circuit
rf transceiver
passthrough circuit
ext. spk.
ext. mic
stand-alone accessory box
stand-alone accessory box
rf transceiver
rf filter circuit
rf-audio signal converter
audio-rf signal converter
audio in
control circuit
audio out
pre-existing VCR
ir detect
remote control signal generator
ir transmit

Figure 6

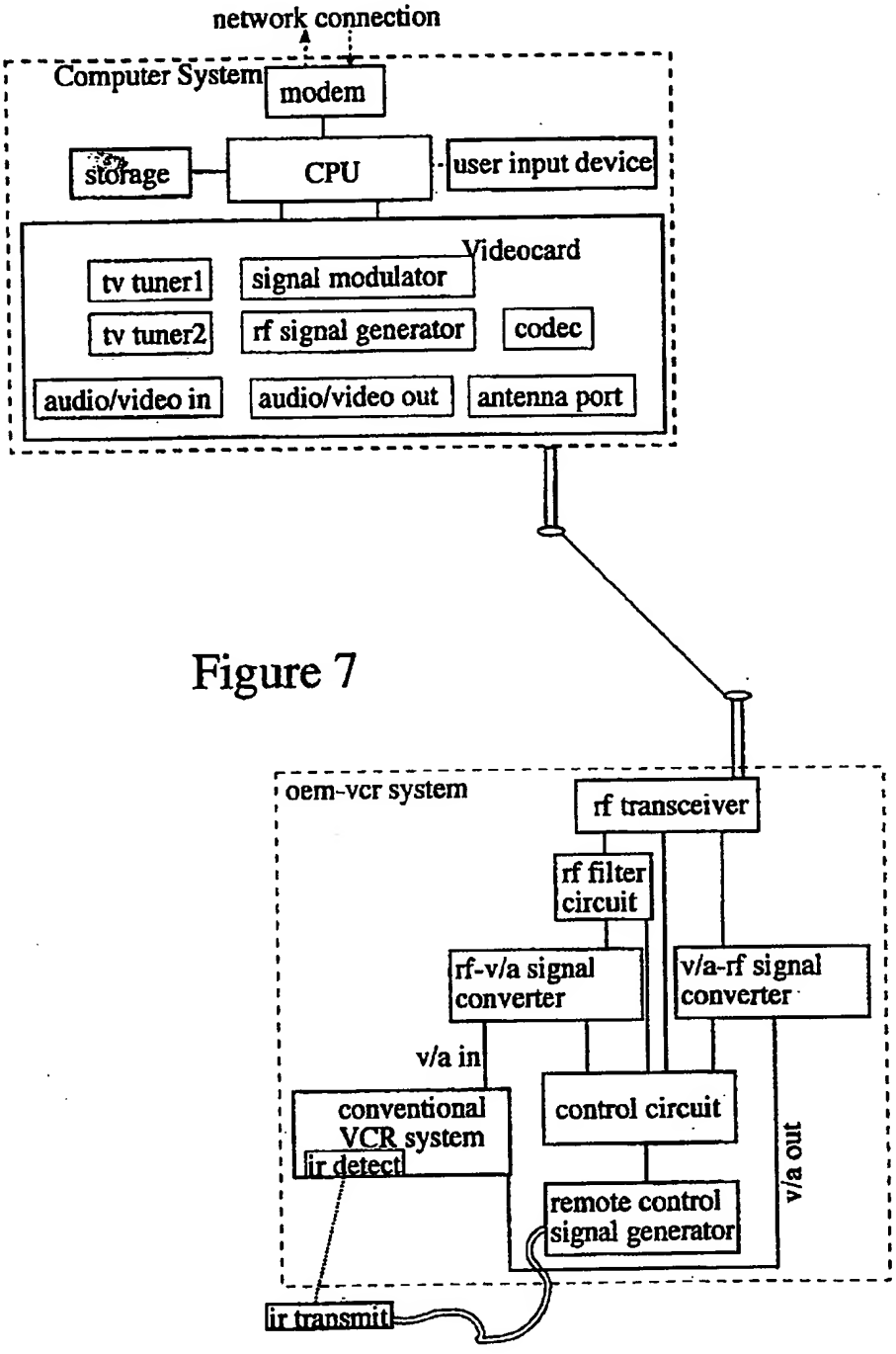

network connection
Computer System
modem
storage
CPU
user input device
Videocard
tv tuner1
signal modulator
tv tuner2
rf signal generator
codec
audio/video in
audio/video out
antenna port
oem-vcr system
rf transceiver
rf filter circuit
rf-v/a signal converter
v/a-rf signal converter
v/a in
conventional VCR system
ir detect
control circuit
remote control signal generator
v/a out
ir transmit

Figure 7

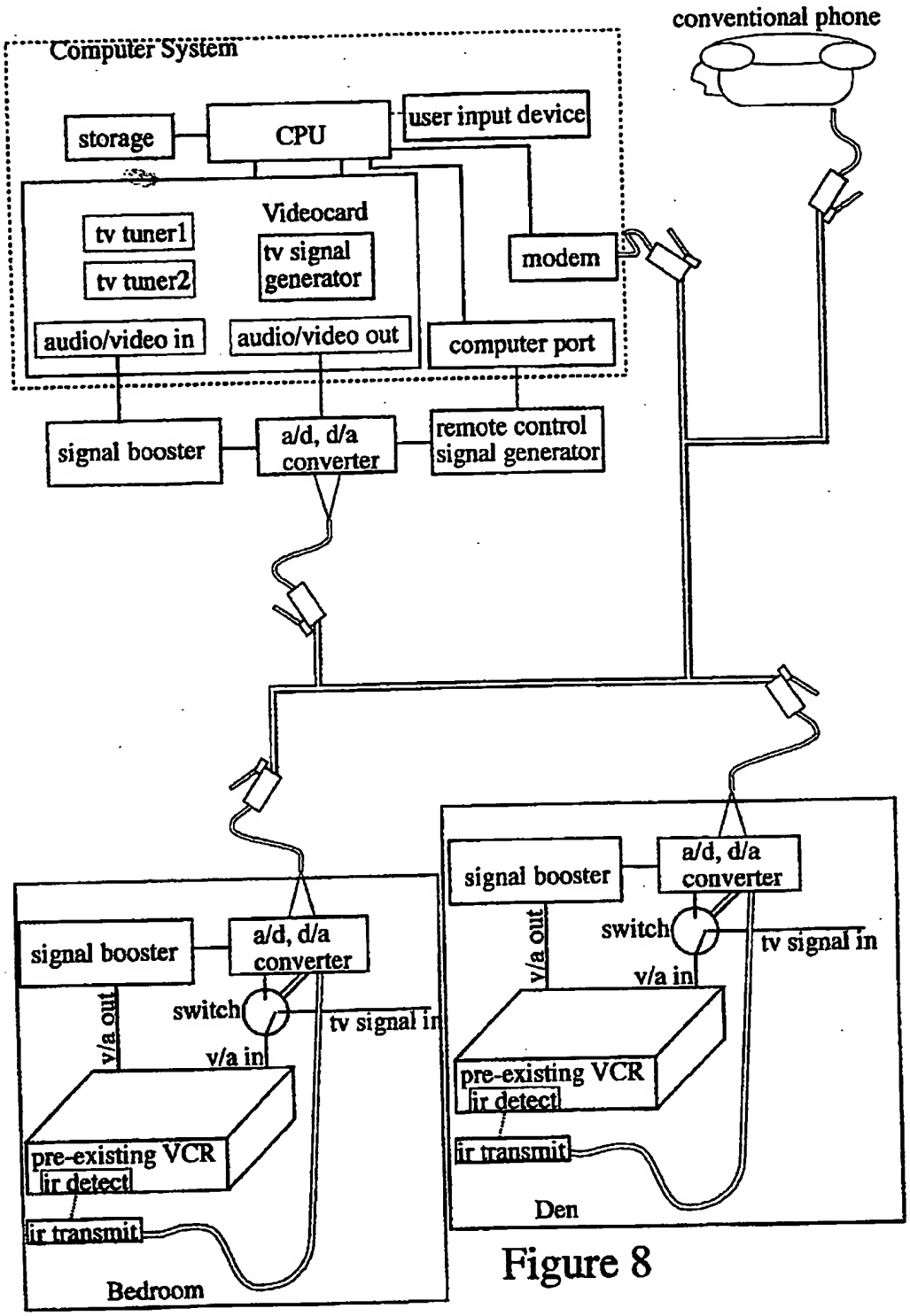

conventional phone
Computer System
storage
CPU
user input device
Videocard
tv tuner1
tv tuner2
tv signal generator
modem
audio/video in
audio/video out
computer port
signal booster
a/d, d/a converter
remote control signal generator
signal booster
a/d, d/a converter
switch
tv signal in
v/a out
v/a in
pre-existing VCR
ir detect
ir transmit
Bedroom
signal booster
a/d, d/a converter
switch
tv signal in
v/a out
v/a in
pre-existing VCR
ir detect
ir transmit
Den

Figure 8

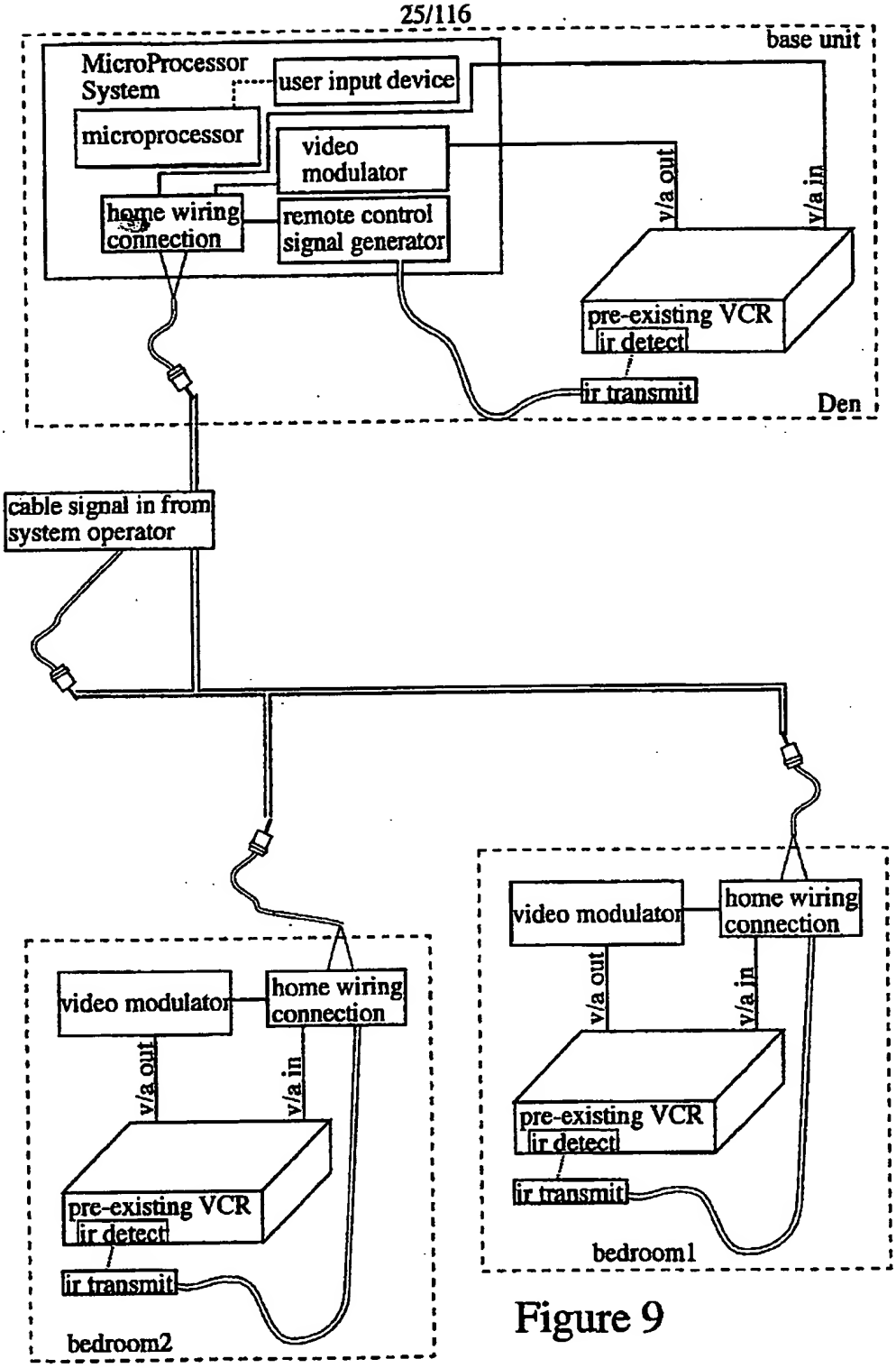

base unit
MicroProcessor System
user input device
microprocessor
video modulator
home wiring connection
remote control signal generator
v/a out
v/a in
pre-existing VCR
ir detect
ir transmit
Den
cable signal in from system operator
video modulator
home wiring connection
v/a out
v/a in
pre-existing VCR
ir detect
ir transmit
bedroom2
video modulator
home wiring connection
v/a out
v/a in
pre-existing VCR
ir detect
ir transmit
bedroom1

Figure 9

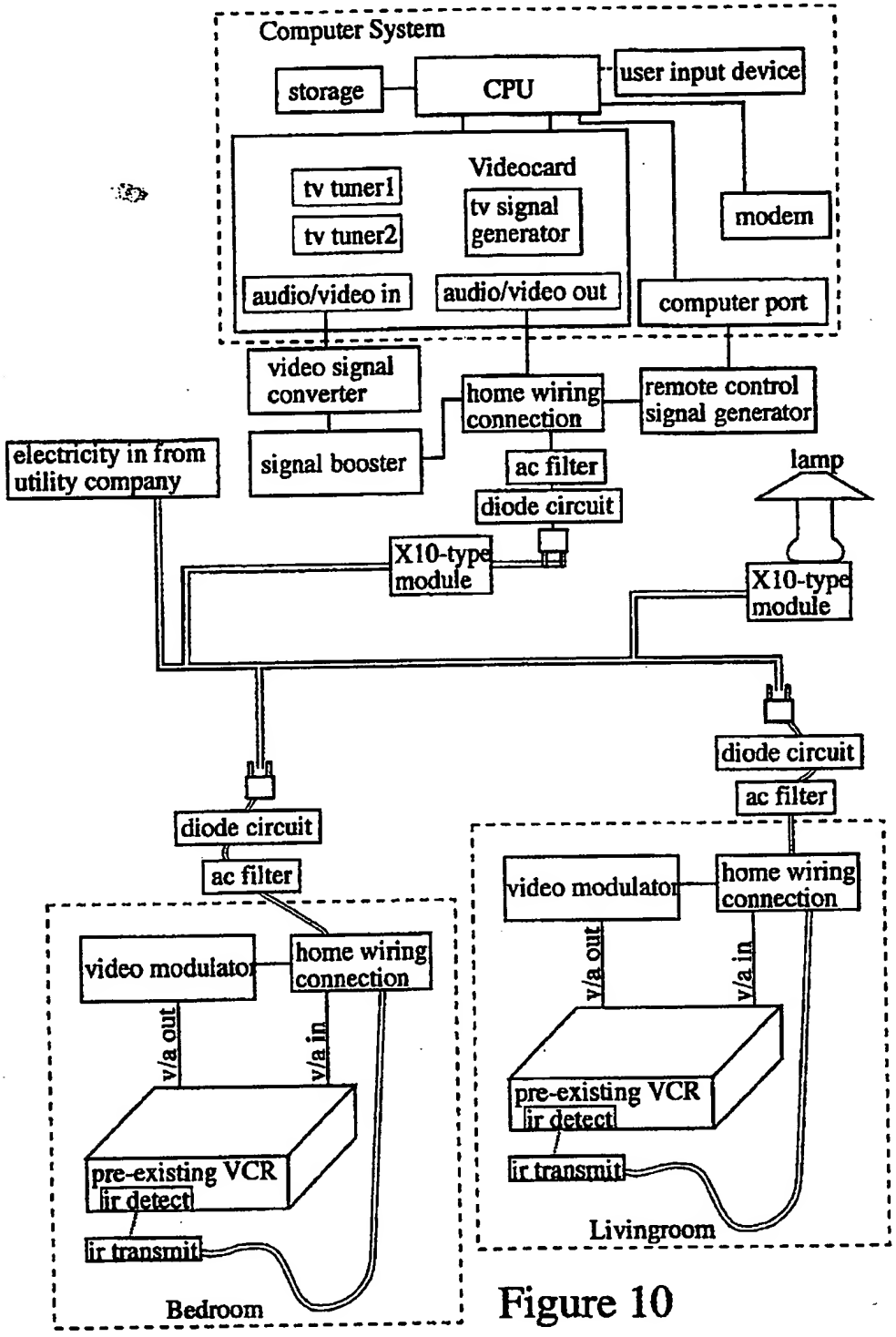

Computer System
storage
CPU
user input device
Videocard
tv tuner1
tv tuner2
tv signal generator
modem
audio/video in
audio/video out
computer port
video signal converter
home wiring connection
remote control signal generator
electricity in from utility company
signal booster
ac filter
diode circuit
lamp
X10-type module
X10-type module
diode circuit
ac filter
diode circuit
ac filter
video modulator
home wiring connection
v/a out
v/a in
pre-existing VCR
ir detect
ir transmit
Bedroom
video modulator
home wiring connection
v/a out
v/a in
pre-existing VCR
ir detect
ir transmit
Livingroom

Figure 10

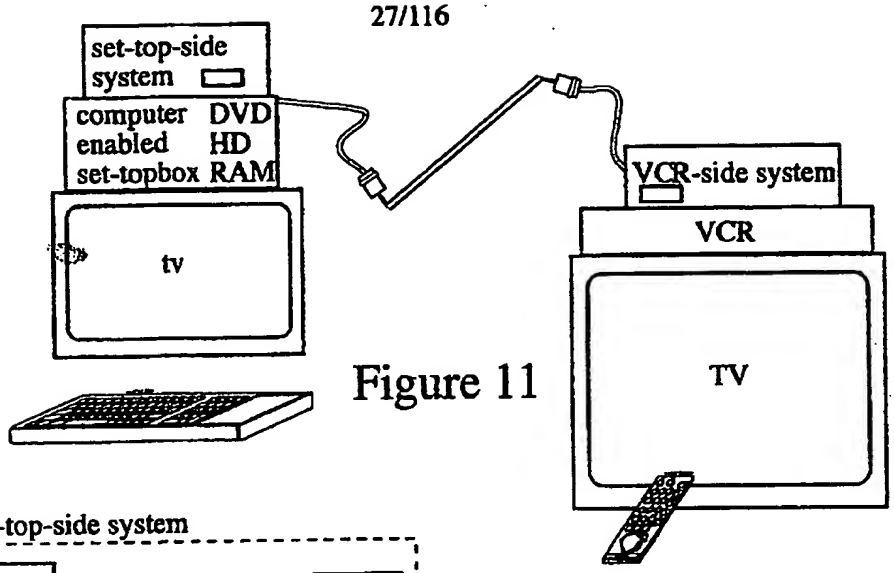


Figure 11

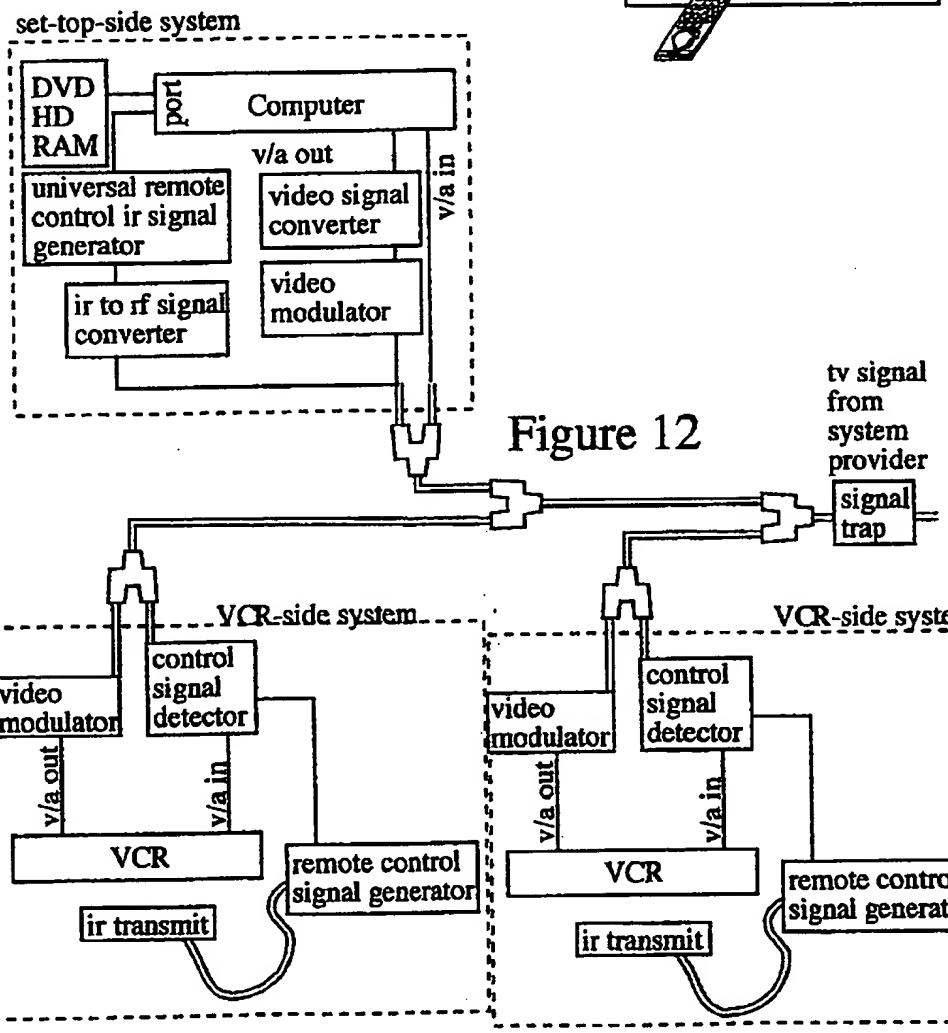


Figure 12

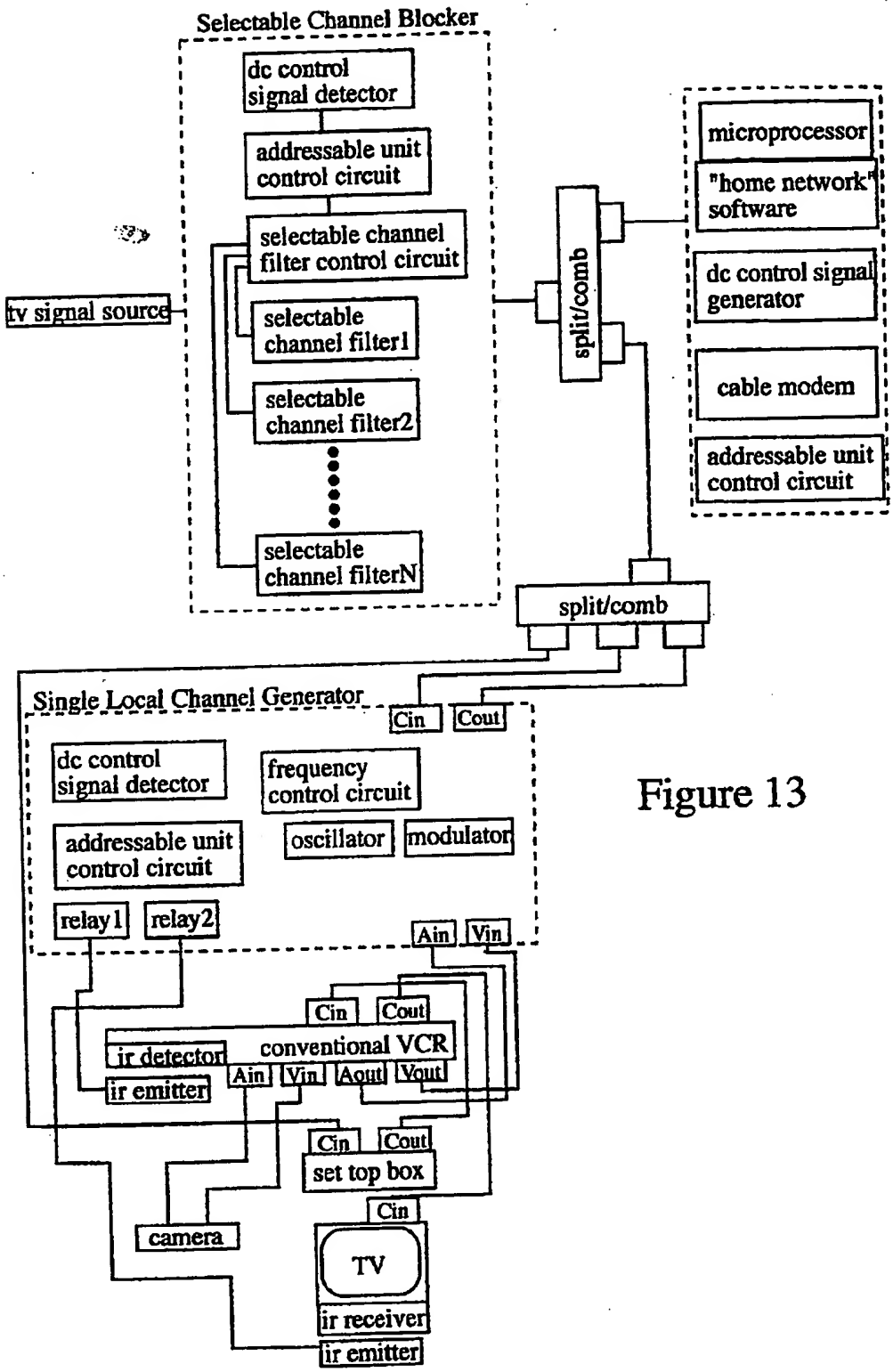

Selectable Channel Blocker
dc control signal detector
addressable unit control circuit
selectable channel filter control circuit
selectable channel filter1
selectable channel filter2
selectable channel filterN
tv signal source
split/comb
microprocessor
"home network" software
dc control signal generator
cable modem
addressable unit control circuit
split/comb
Single Local Channel Generator
Cin
Cout
dc control signal detector
frequency control circuit
addressable unit control circuit
oscillator
modulator
relay1
relay2
Ain
Vin
Cin
Cout
ir detector
conventional VCR
ir emitter
Ain
Vin
Aout
Vout
Cin
Cout
set top box
Cin
camera
TV
ir receiver
ir emitter

Figure 13

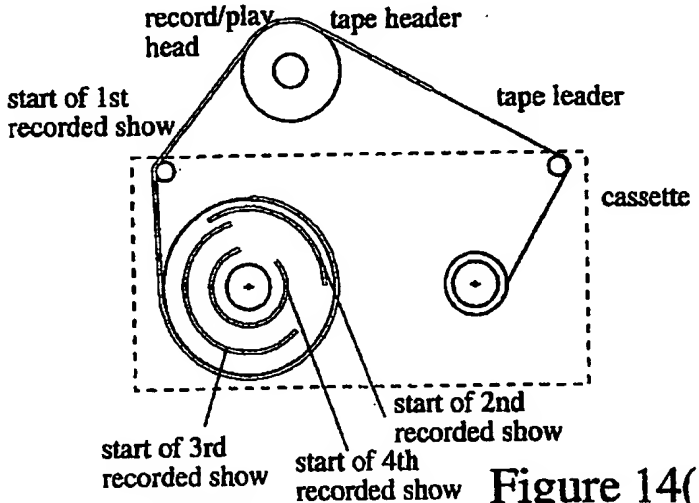


Figure 14(a)

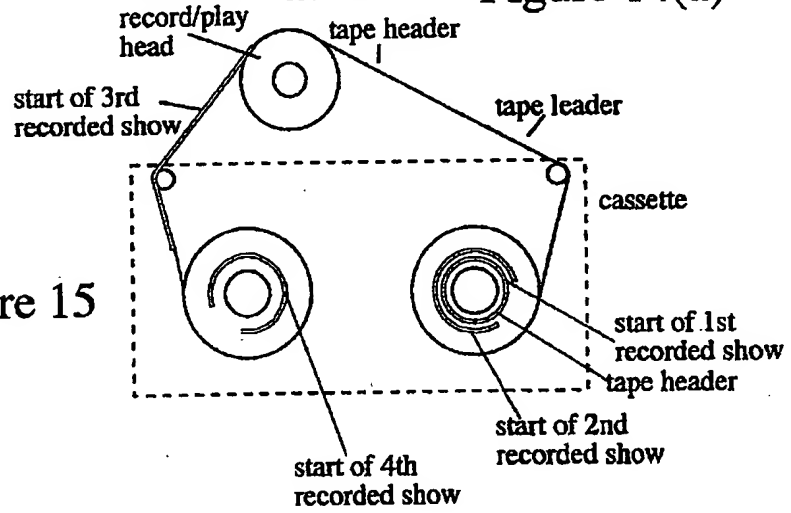


Figure 15

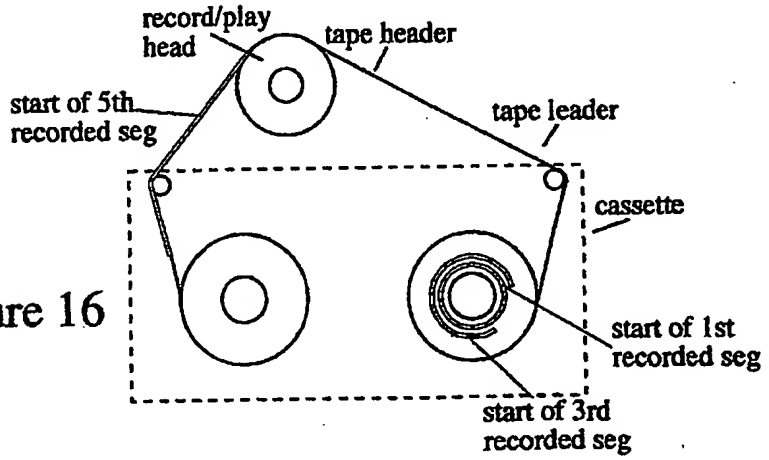


Figure 16

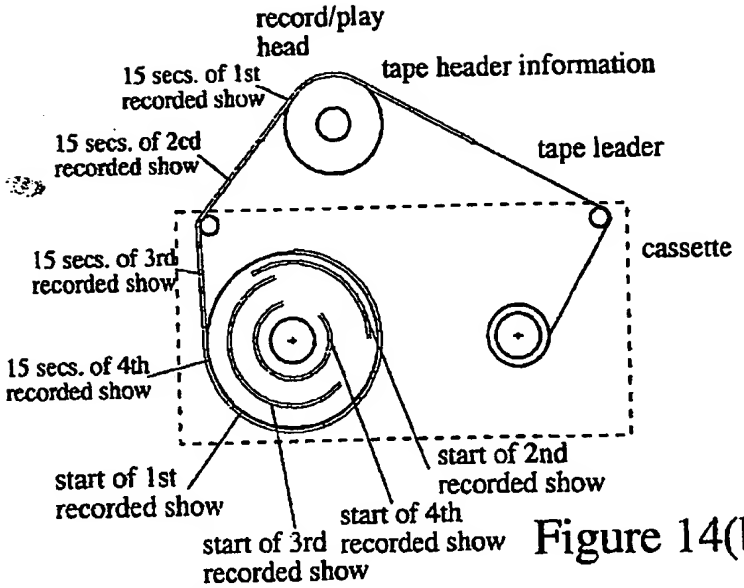


Figure 14(b)

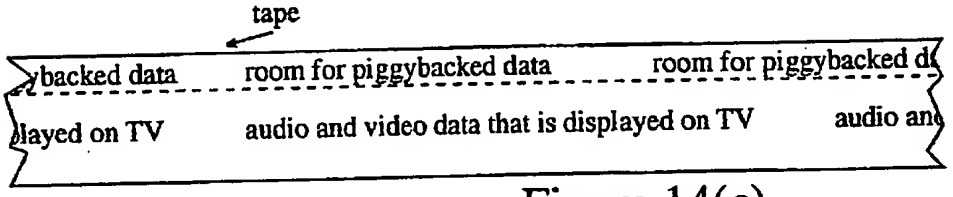


Figure 14(c)

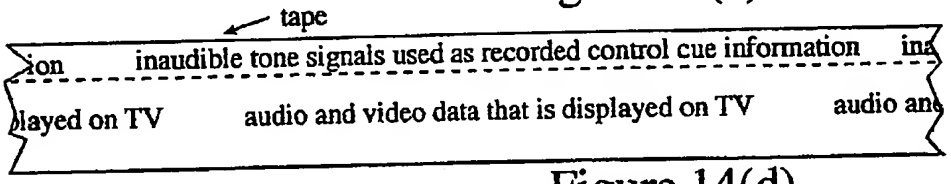


Figure 14(d)

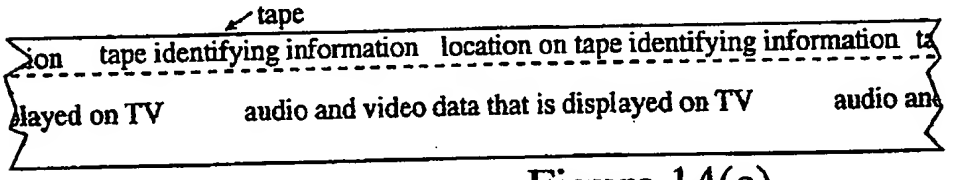


Figure 14(e)

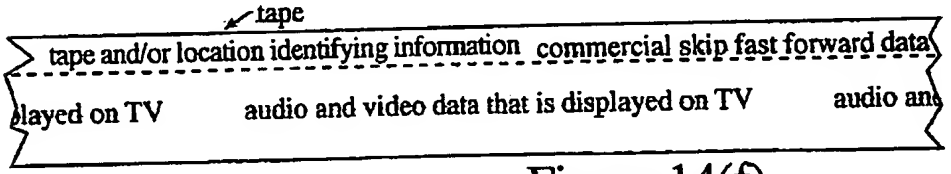


Figure 14(f)

Tape Format Check 31/116

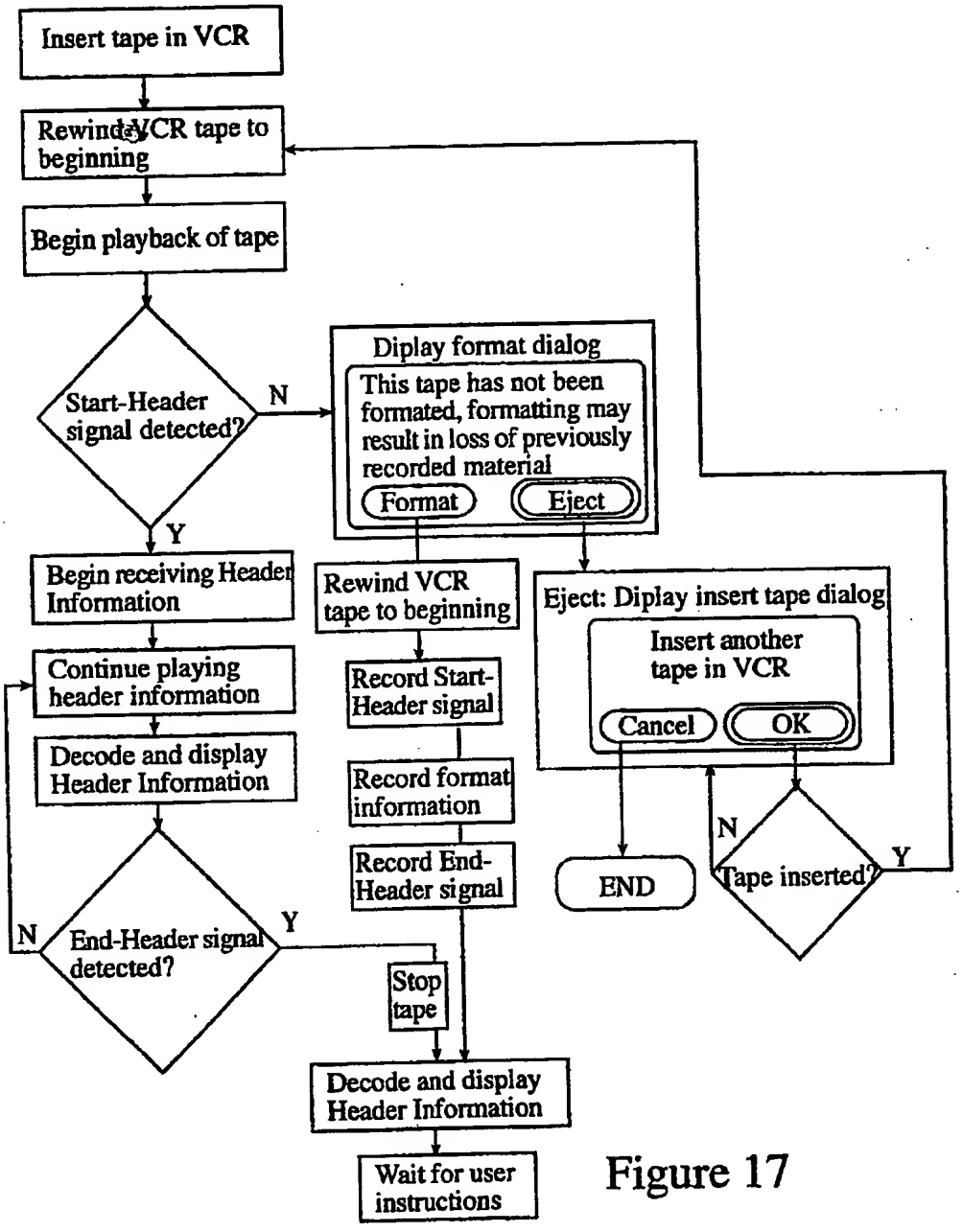


Figure 17

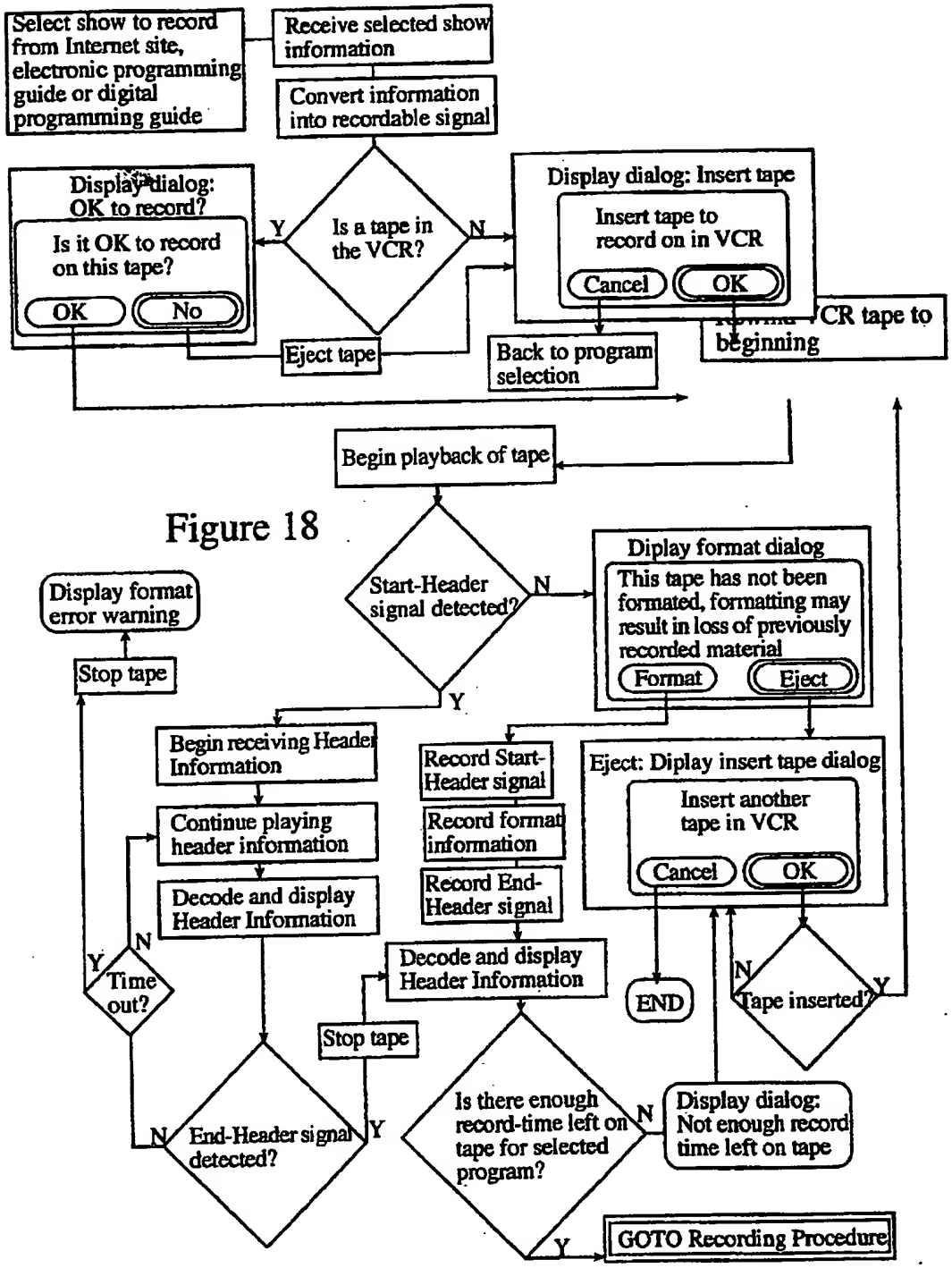

Select show to record from Internet site, electronic programming guide or digital programming guide
Receive selected show information
Convert information into recordable signal
Display dialog: OK to record?
Is it OK to record on this tape?
OK
No
Is a tape in the VCR?
Y
N
Display dialog: Insert tape
Insert tape to record on in VCR
Cancel
OK
Eject tape
Back to program selection
CR tape to beginning
Begin playback of tape
Start-Header signal detected?
N
Y
Diplay format dialog
This tape has not been formated, formatting may result in loss of previously recorded material
Format
Eject
Display format error warning
Stop tape
Begin receiving Header Information
Continue playing header information
Decode and display Header Information
Time out?
Y
N
End-Header signal detected?
N
Y
Stop tape
Record Start-Header signal
Record format information
Record End-Header signal
Decode and display Header Information
Is there enough record-time left on tape for selected program?
N
Y
Display dialog: Not enough record time left on tape
GOTO Recording Procedure
Eject: Diplay insert tape dialog
Insert another tape in VCR
Cancel
OK
END
Tape inserted?
N
Y

Figure 18

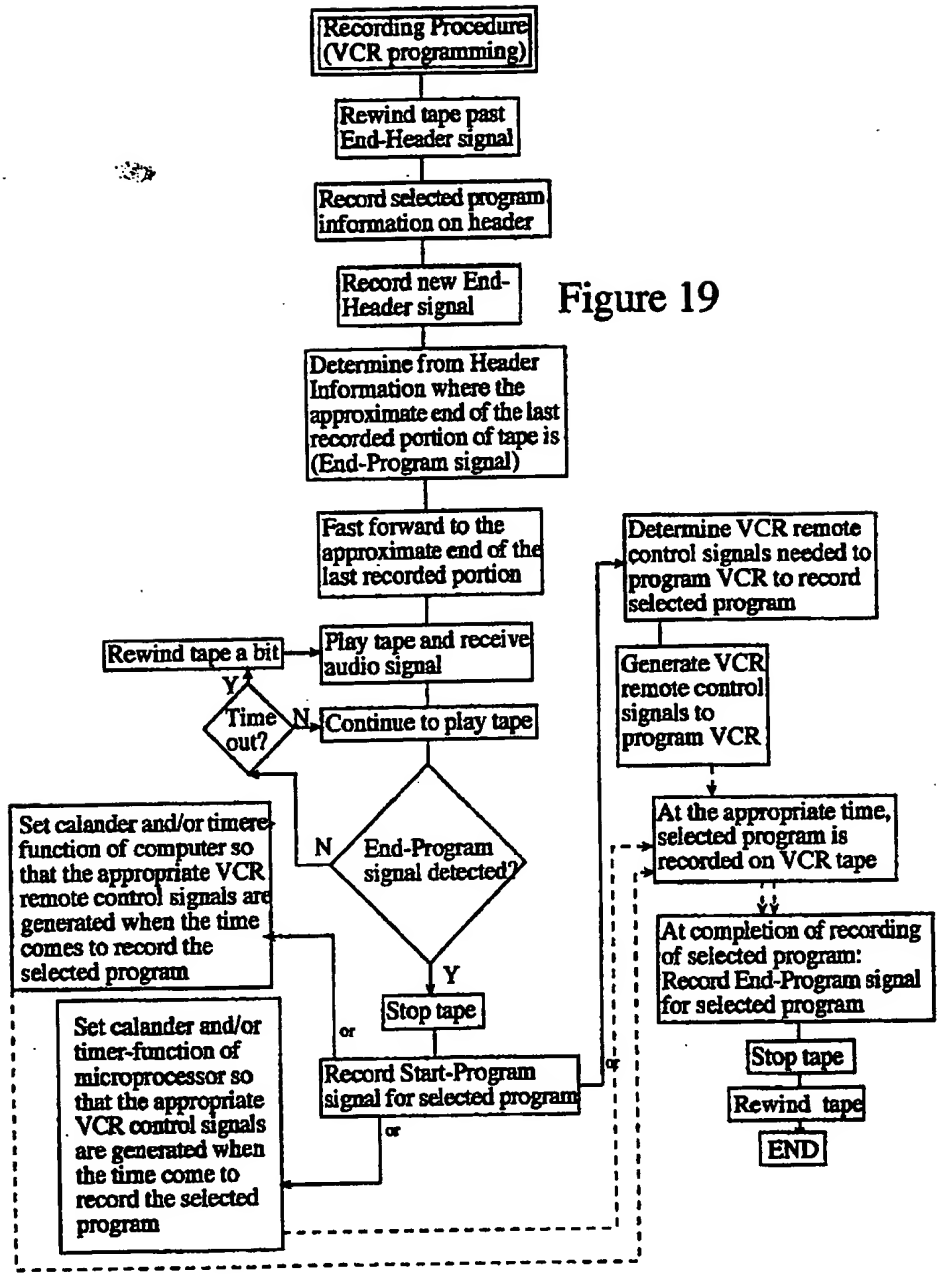

Recording Procedure (VCR programming)
Rewind tape past End-Header signal
Record selected program information on header
Record new End-Header signal
Determine from Header Information where the approximate end of the last recorded portion of tape is (End-Program signal)
Fast forward to the approximate end of the last recorded portion
Rewind tape a bit
Play tape and receive audio signal
Y
Time out?
N
Continue to play tape
N
End-Program signal detected?
Y
Stop tape
Record Start-Program signal for selected program
or
or
Set calander and/or timere function of computer so that the appropriate VCR remote control signals are generated when the time comes to record the selected program
Set calander and/or timer-function of microprocessor so that the appropriate VCR control signals are generated when the time come to record the selected program
Determine VCR remote control signals needed to program VCR to record selected program
Generate VCR remote control signals to program VCR
At the appropriate time, selected program is recorded on VCR tape
At completion of recording of selected program: Record End-Program signal for selected program
Stop tape
Rewind tape
END

Figure 19

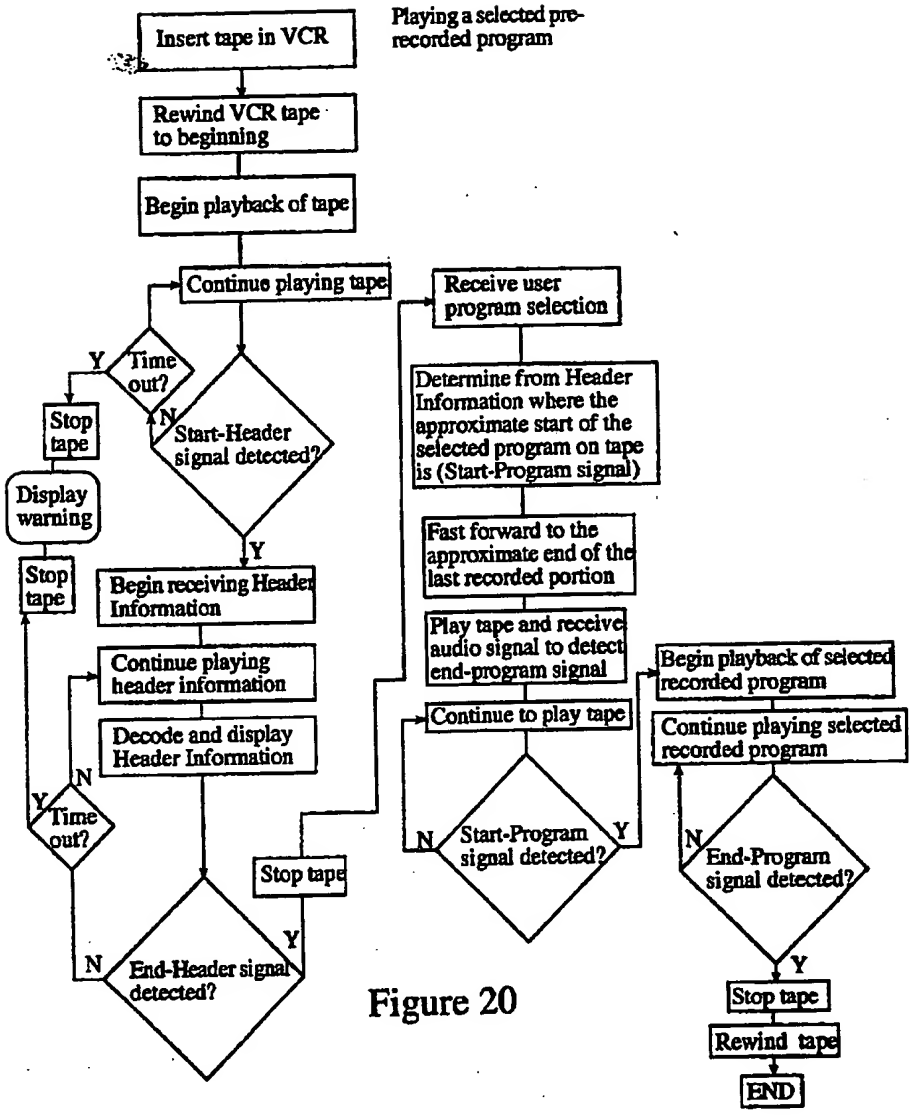

Insert tape in VCR
Playing a selected pre-recorded program
Rewind VCR tape to beginning
Begin playback of tape
Continue playing tape
Time out?
Y
N
Stop tape
Display warning
Stop tape
Start-Header signal detected?
Y
Begin receiving Header Information
Continue playing header information
Decode and display Header Information
N
Y
Time out?
N
End-Header signal detected?
Y
Stop tape
Receive user program selection
Determine from Header Information where the approximate start of the selected program on tape is (Start-Program signal)
Fast forward to the approximate end of the last recorded portion
Play tape and receive audio signal to detect end-program signal
Continue to play tape
N
Start-Program signal detected?
Y
Begin playback of selected recorded program
Continue playing selected recorded program
N
End-Program signal detected?
Y
Stop tape
Rewind tape
END

Figure 20

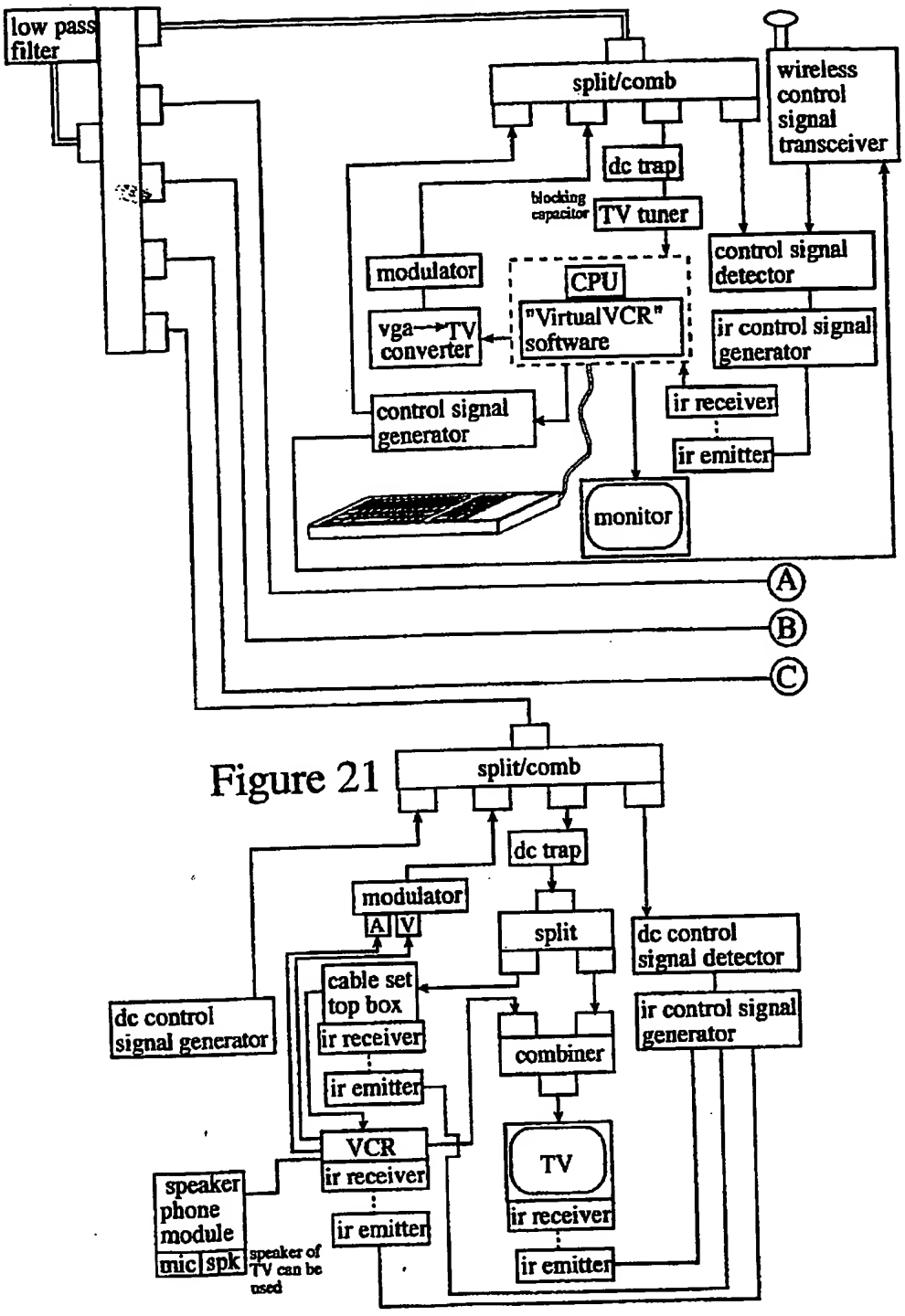
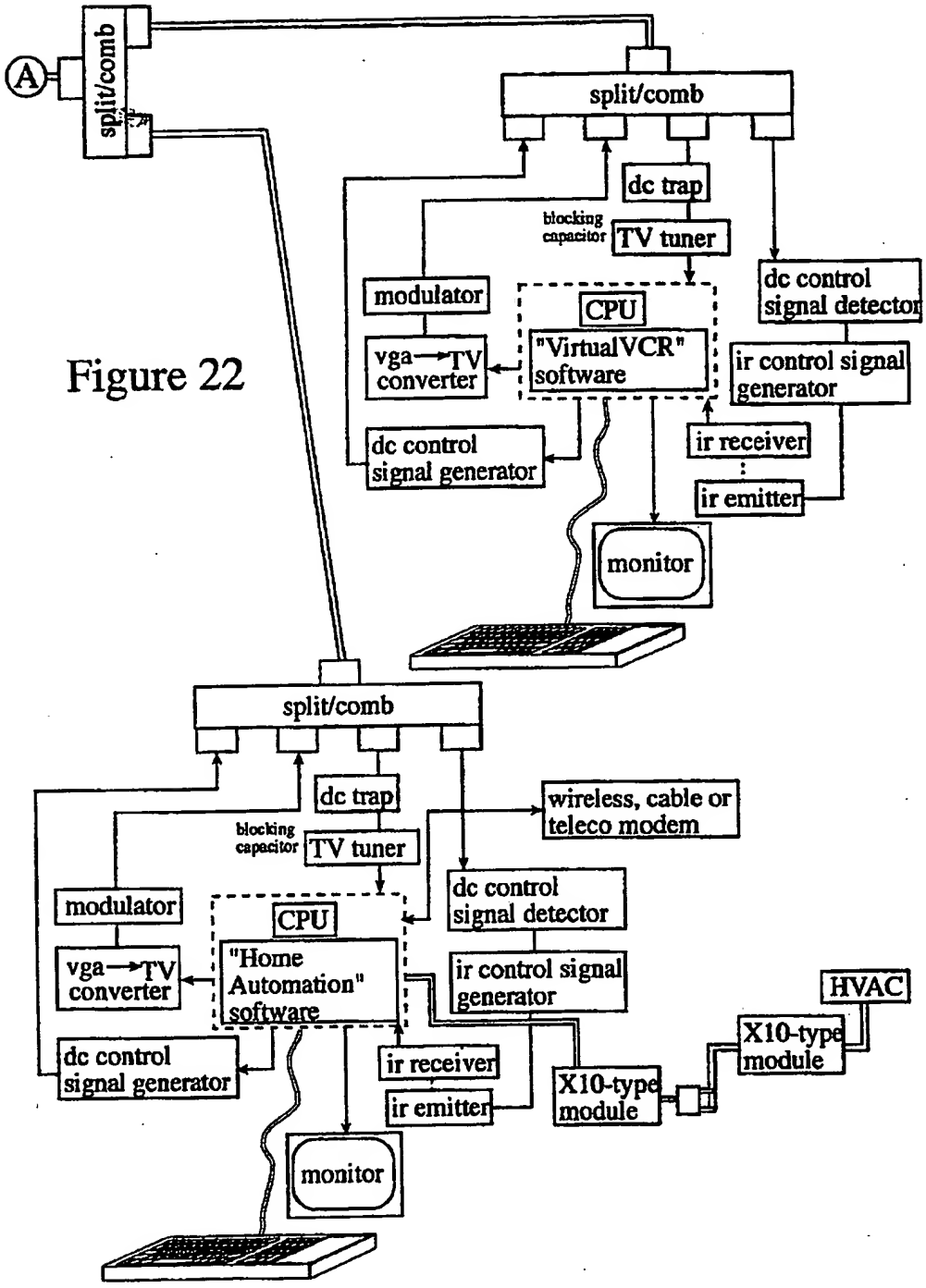

low pass filter
split/comb
wireless control signal transceiver
dc trap
blocking capacitor
TV tuner
modulator
CPU
control signal detector
vga→TV converter
"Virtual VCR" software
ir control signal generator
control signal generator
ir receiver
ir emitter
monitor
A
B
C
split/comb
dc trap
modulator
A
V
split
dc control signal detector
cable set top box
dc control signal generator
ir receiver
ir control signal generator
combiner
ir emitter
VCR
TV
ir receiver
speaker phone module
mic
spk
speaker of TV can be used
ir receiver
ir emitter
ir emitter

Figure 21

Figure 22


A
split/comb
split/comb
dc trap
blocking capacitor
TV tuner
modulator
CPU
vga→TV converter
"VirtualVCR" software
dc control signal detector
ir control signal generator
dc control signal generator
ir receiver
ir emitter
monitor
split/comb
dc trap
blocking capacitor
TV tuner
wireless, cable or teleco modem
modulator
CPU
vga→TV converter
"Home Automation" software
dc control signal detector
ir control signal generator
HVAC
X10-type module
dc control signal generator
ir receiver
ir emitter
X10-type module
monitor

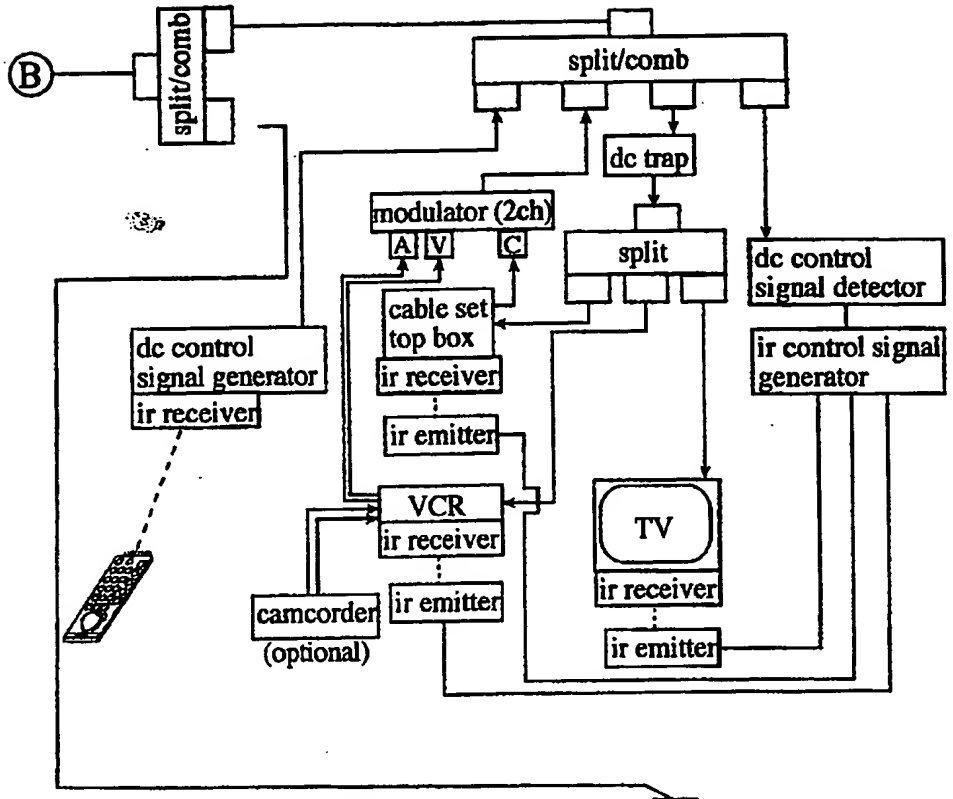
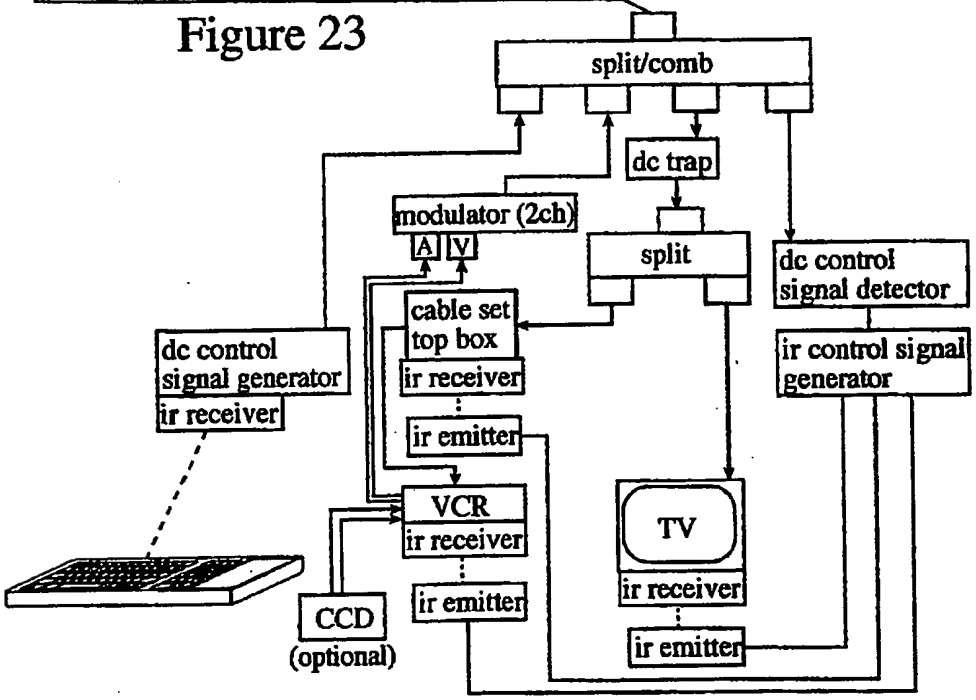

B
split/comb
split/comb
dc trap
modulator (2ch)
A
V
C
split
dc control signal detector
cable set top box
ir receiver
dc control signal generator
ir receiver
ir control signal generator
ir emitter
VCR
ir receiver
TV
ir receiver
camcorder
(optional)
ir emitter
ir emitter

Figure 23


split/comb
dc trap
modulator (2ch)
A
V
split
dc control signal detector
cable set top box
ir receiver
dc control signal generator
ir receiver
ir control signal generator
ir emitter
VCR
ir receiver
TV
ir receiver
CCD
(optional)
ir emitter
ir emitter

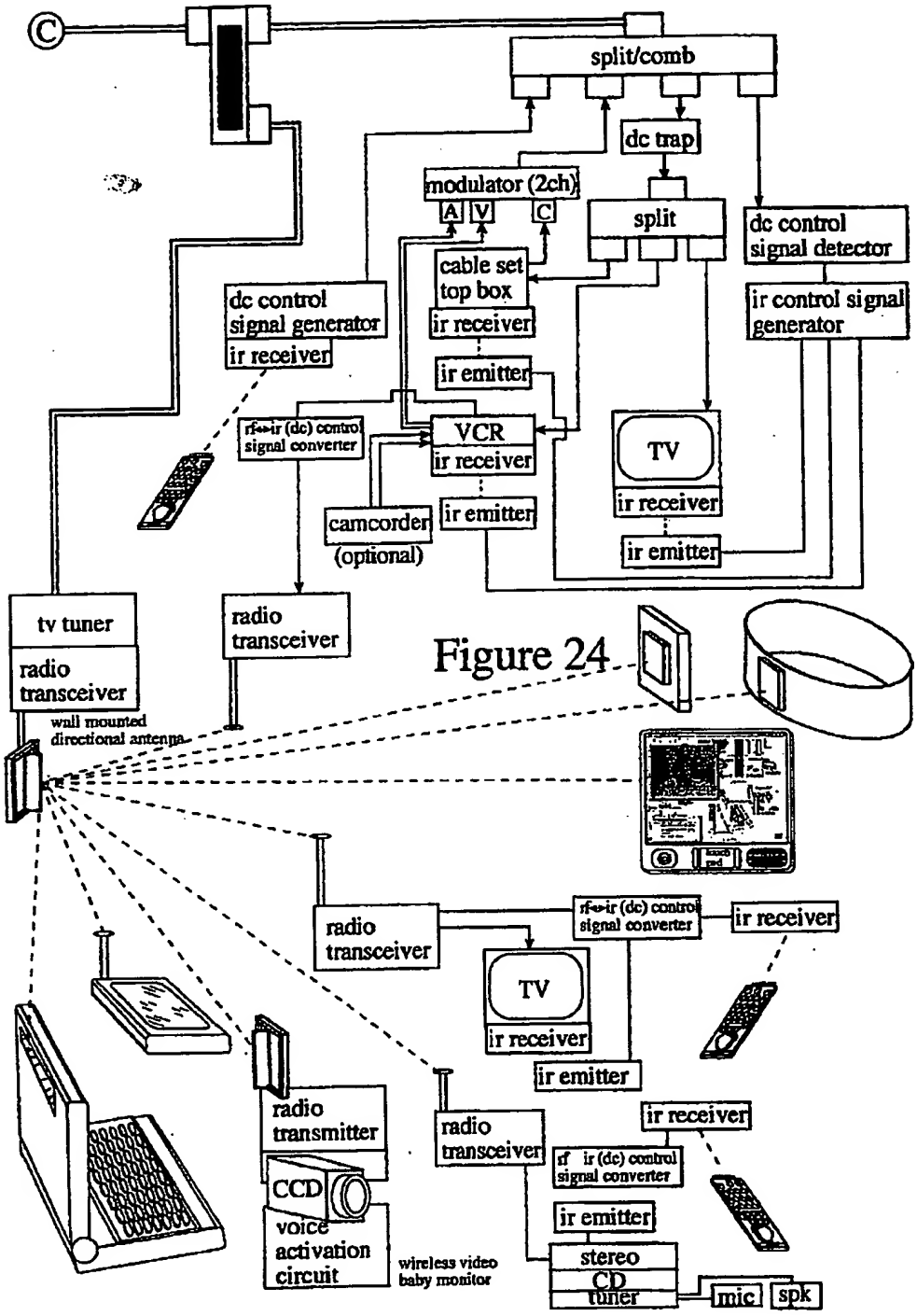

split/comb
dc trap
modulator (2ch)
A
V
C
split
dc control signal detector
cable set top box
ir receiver
ir emitter
dc control signal generator
ir receiver
ir control signal generator
rf⇔ir (dc) control signal converter
VCR
ir receiver
TV
ir receiver
camcorder
(optional)
ir emitter
ir emitter
tv tuner
radio transceiver
radio transceiver
wall mounted directional antenna
radio transceiver
rf⇔ir (dc) control signal converter
ir receiver
TV
ir receiver
ir emitter
radio transmitter
CCD
voice activation circuit
wireless video baby monitor
radio transceiver
ir receiver
rf ir (dc) control signal converter
ir emitter
stereo CD tuner
mic
spk

Figure 24

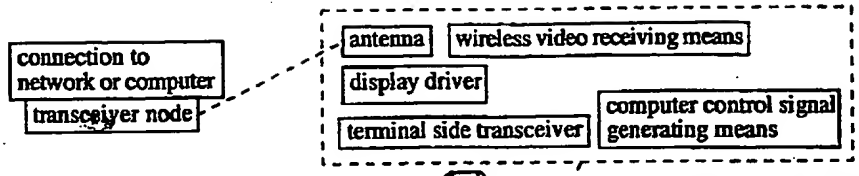
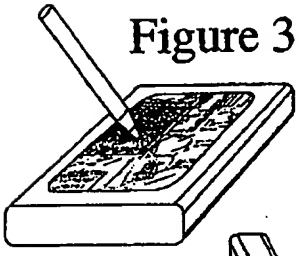


Figure 31



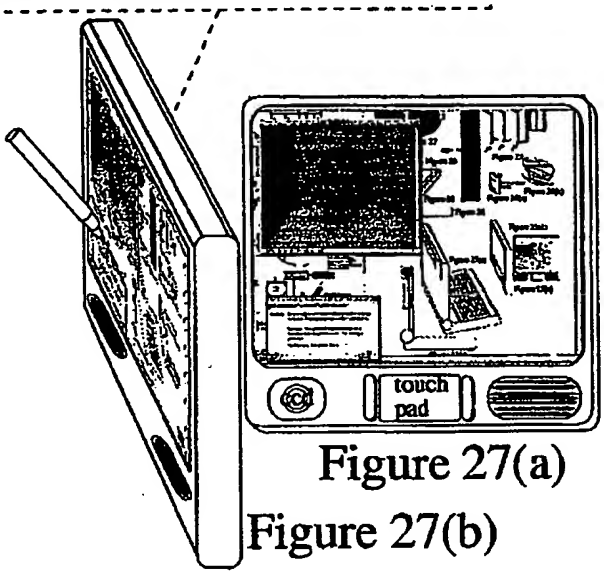


Figure 27(a)

Figure 27(b)

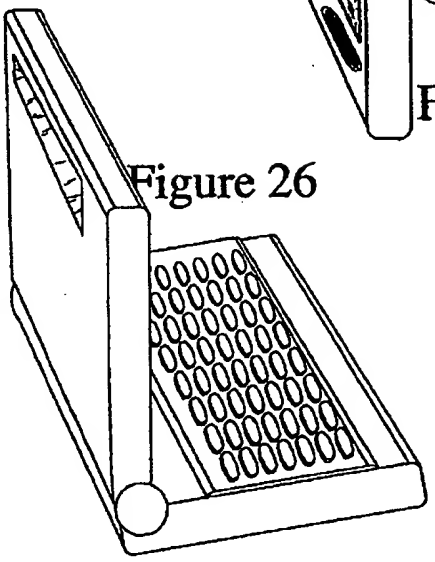


Figure 26

Figure 25

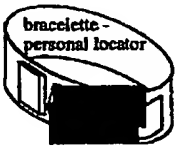


Figure 29

Figure 30(a)

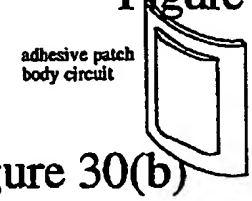


Figure 30(b)

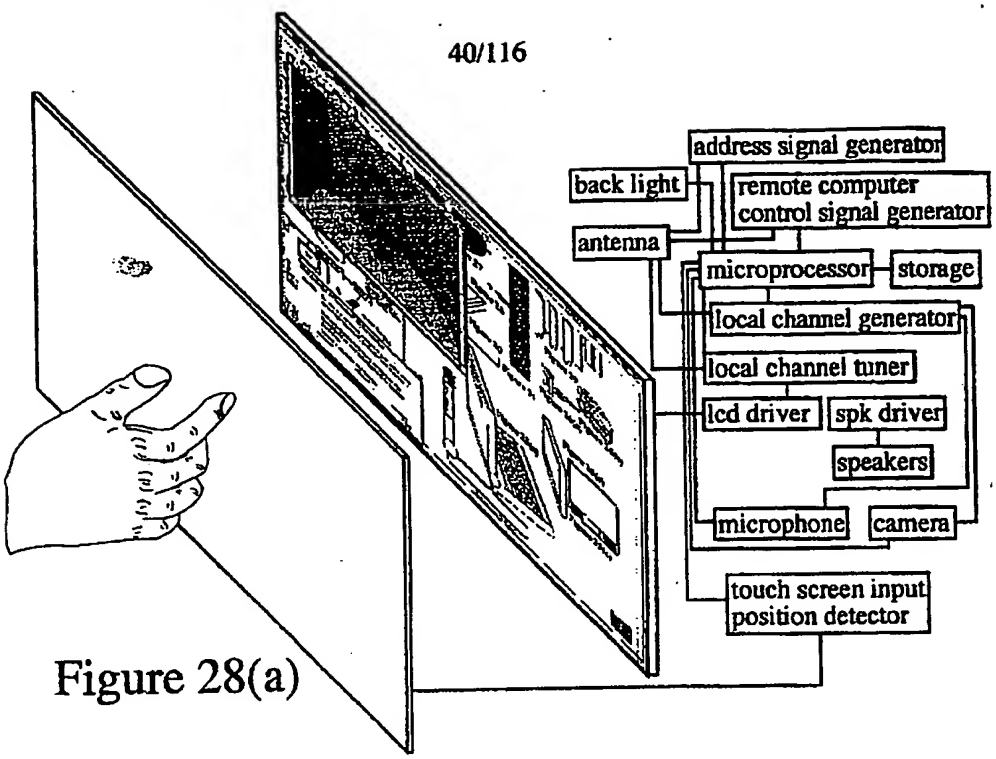


Figure 28(a)

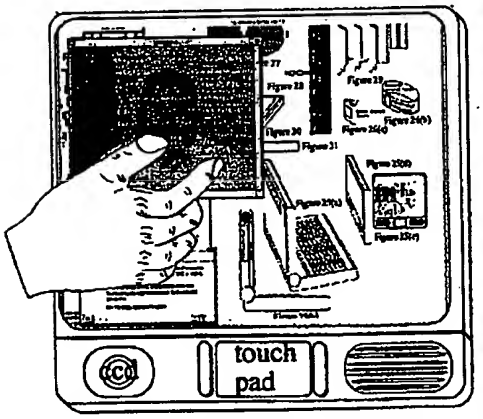


Figure 28(b)

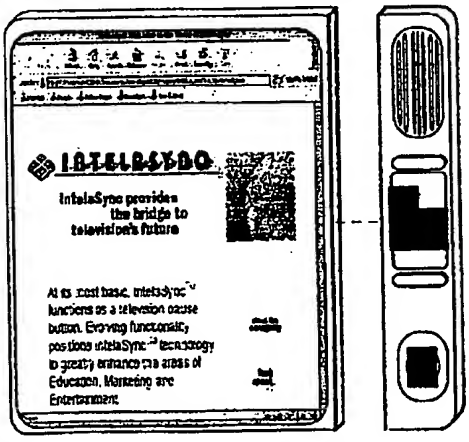


Figure 28(c)

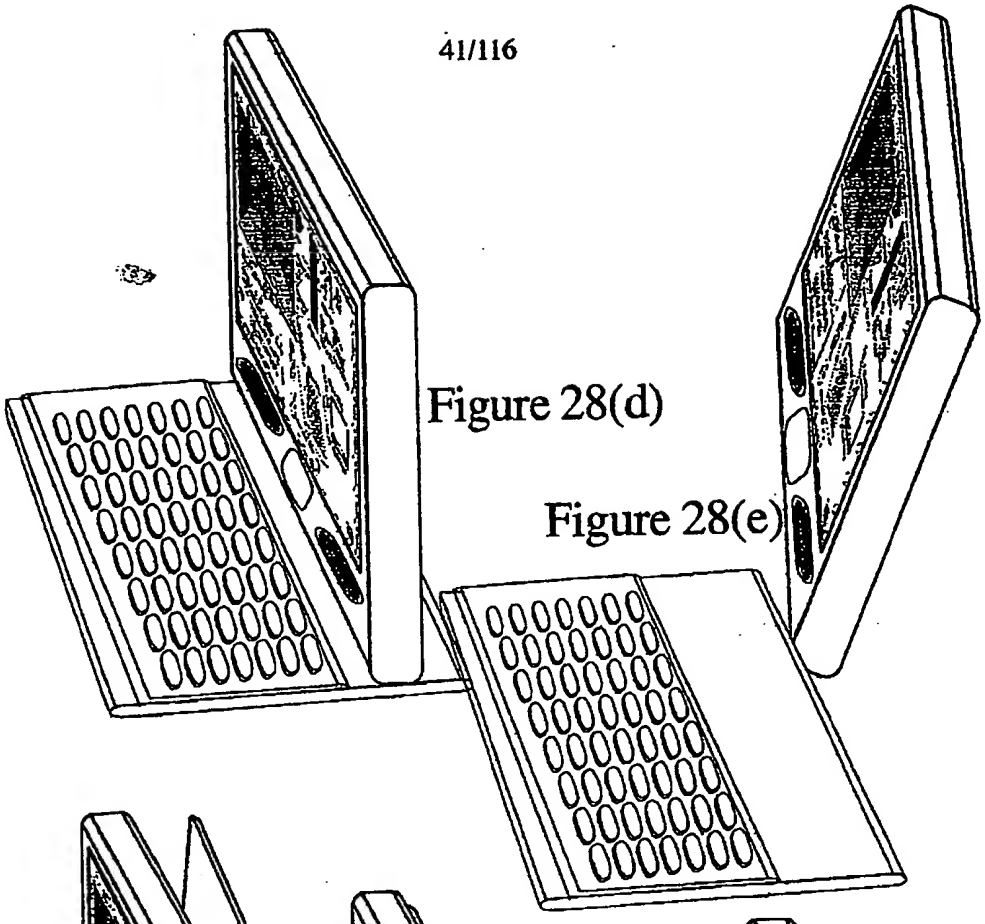


Figure 28(d)

Figure 28(e)

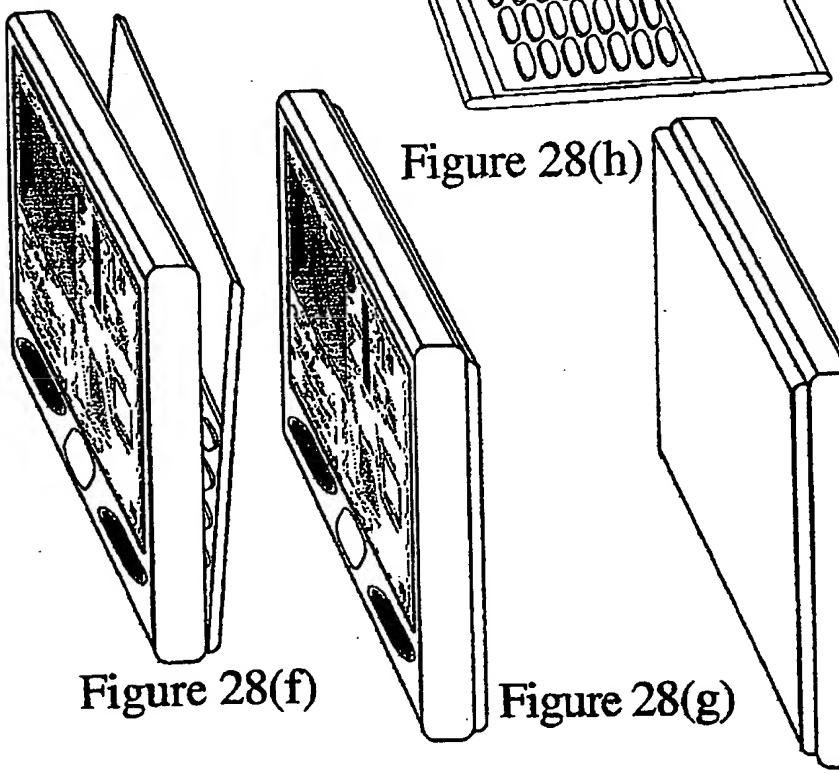


Figure 28(h)

Figure 28(f)

Figure 28(g)

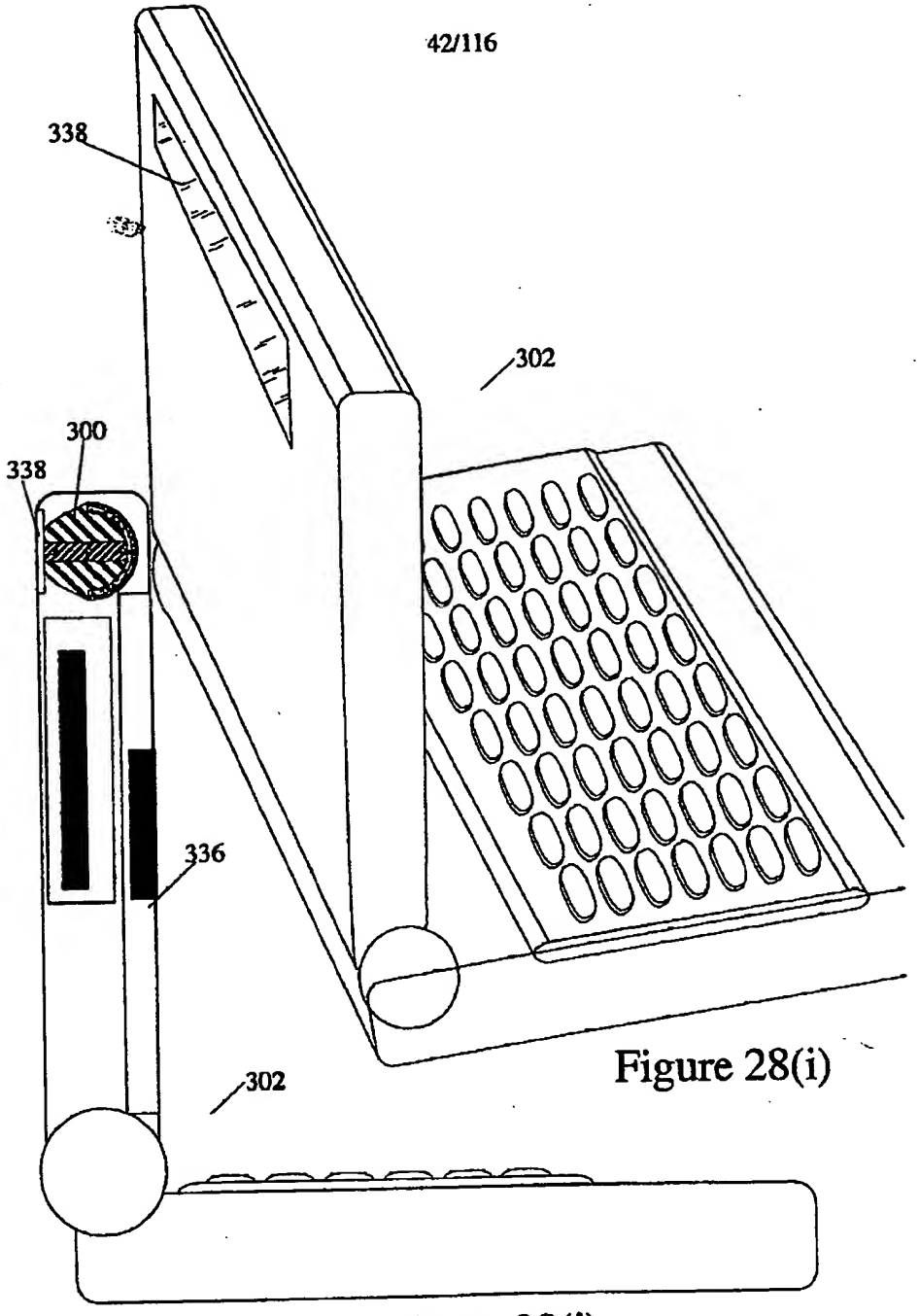


Figure 28(i)

Figure 28(j)

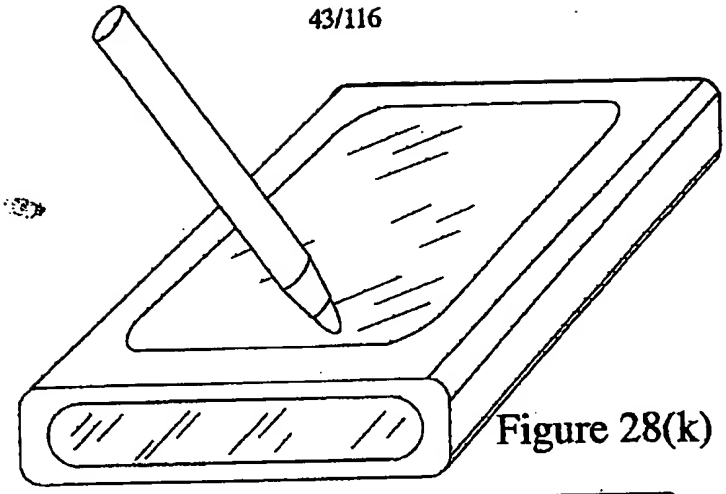


Figure 28(k)

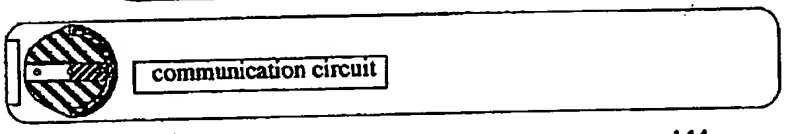


Figure 28(l)

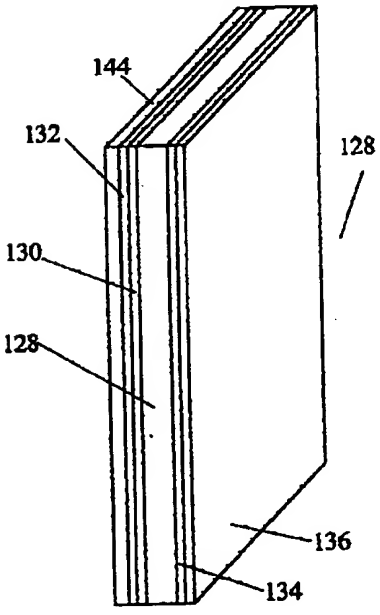


Figure 28(m)

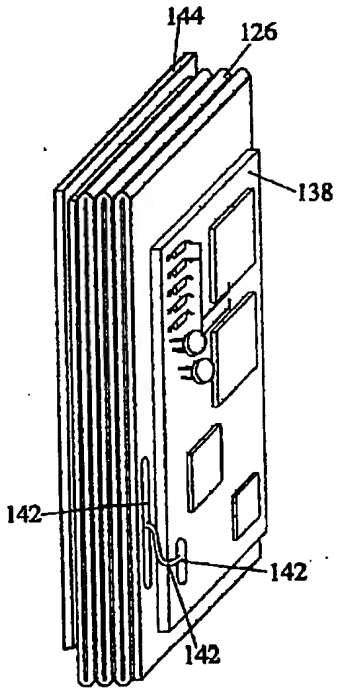


Figure 28(n)

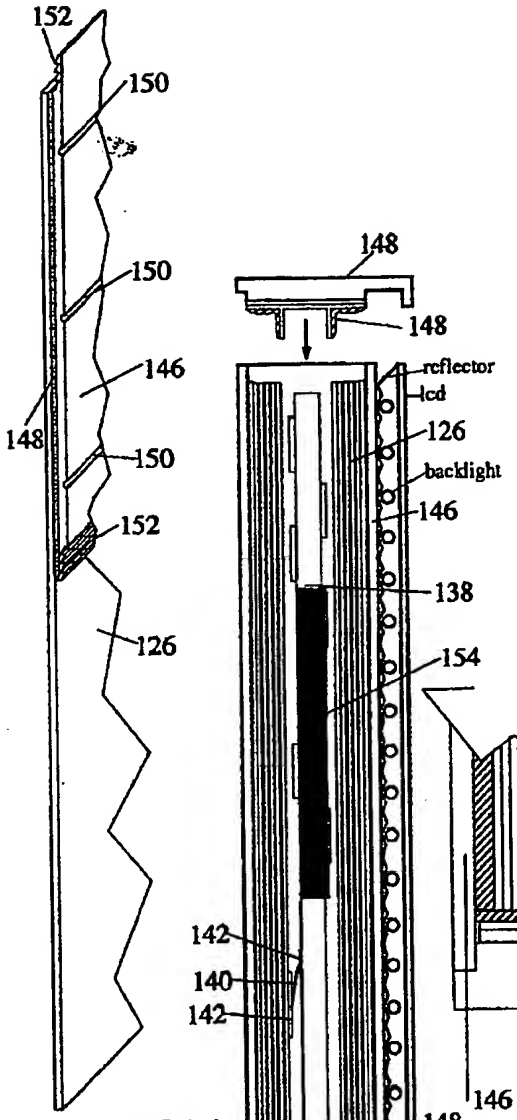


Figure 28(o)

Figure 28(q)

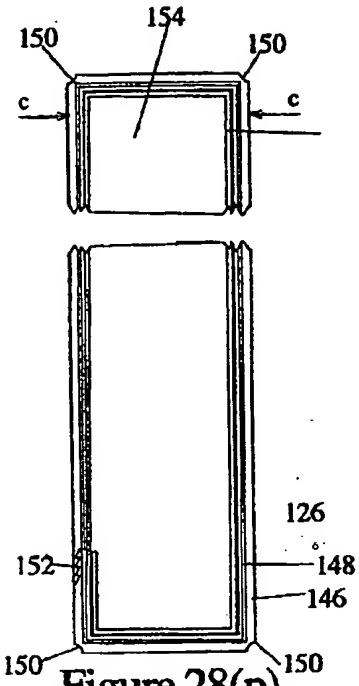


Figure 28(p)

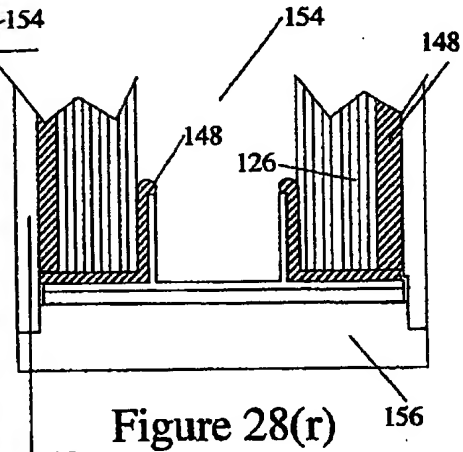


Figure 28(r)

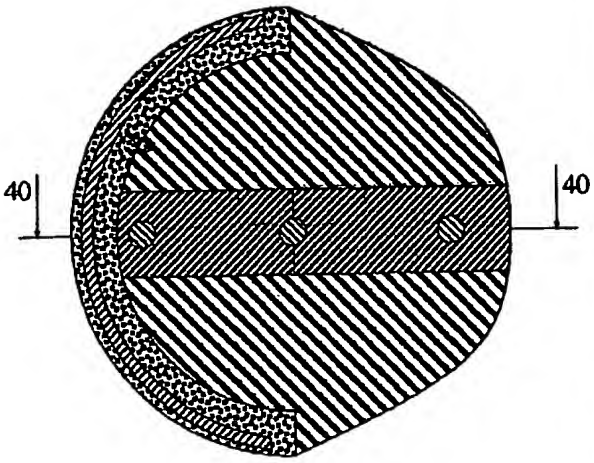


Figure 28(s)

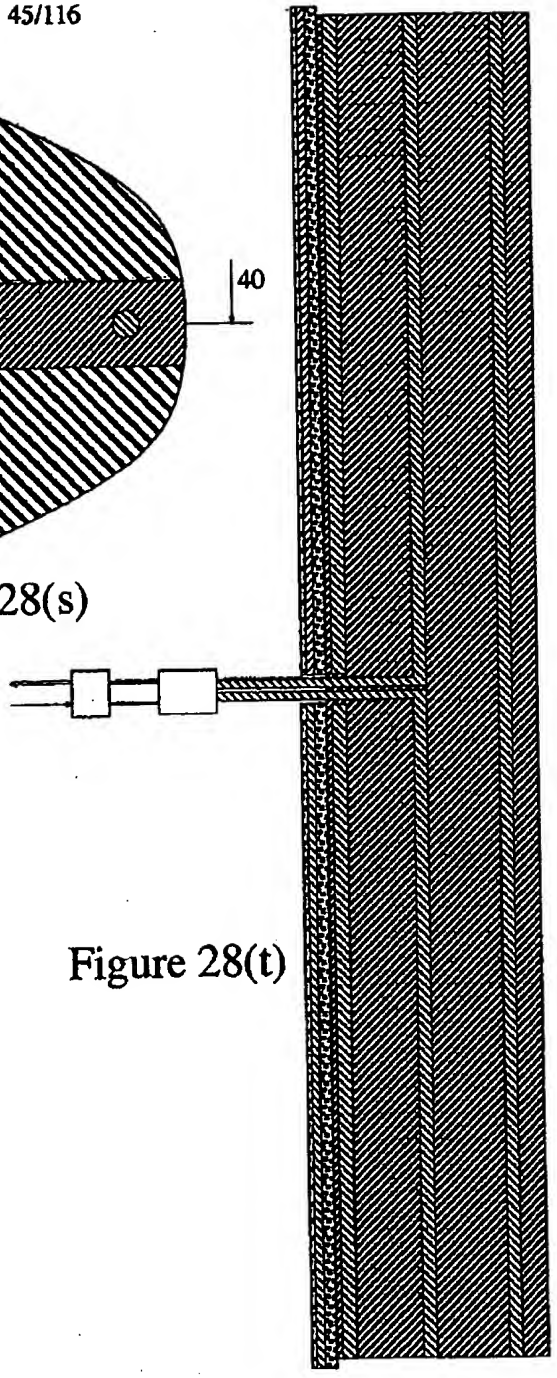


Figure 28(t)

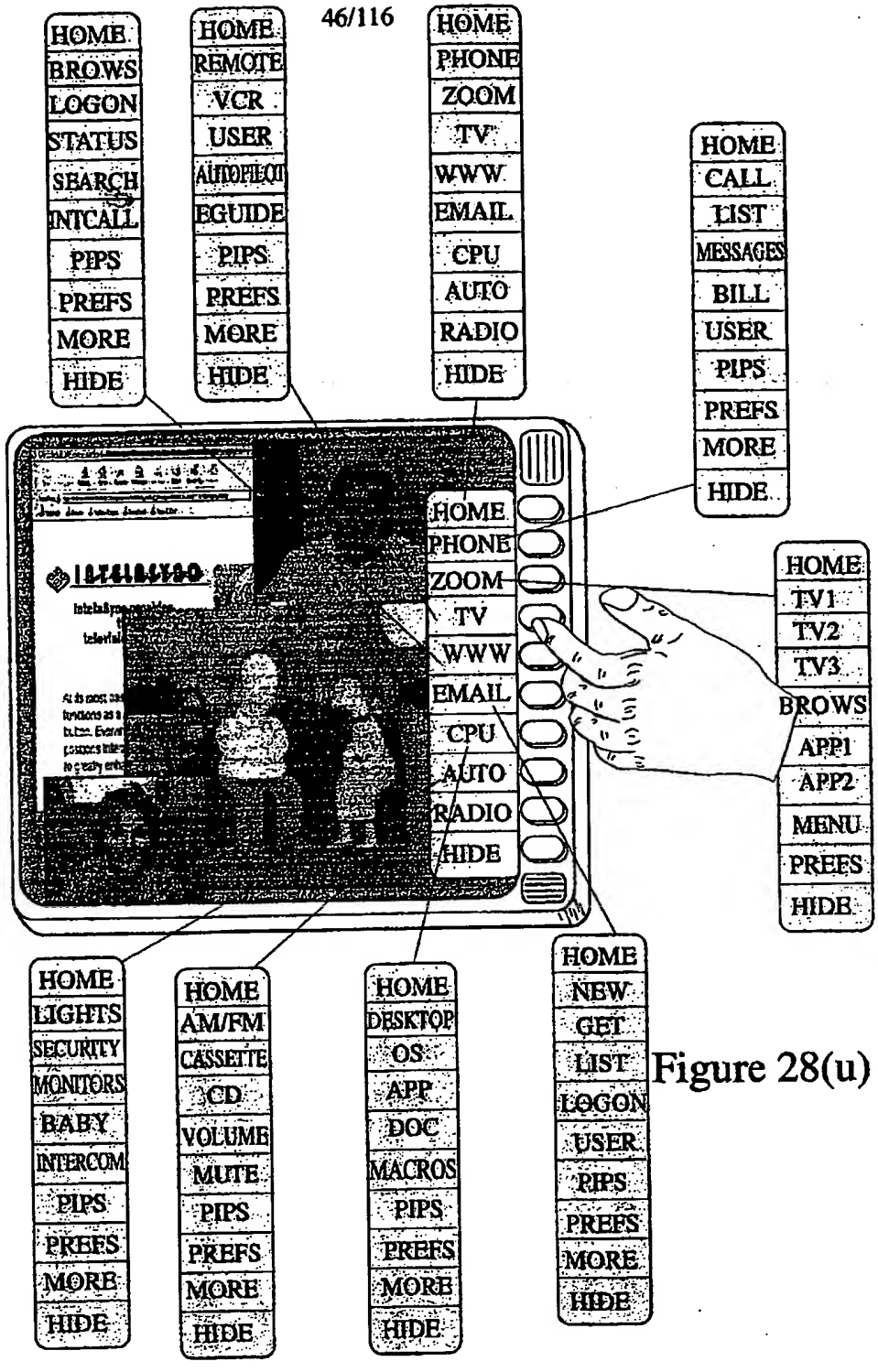

HOME
BROWS
LOGON
STATUS
SEARCH
INTCALL
PIPS
PREFS
MORE
HIDE
HOME
REMOTE
VCR
USER
AUTOPILOT
EGUIDE
PIPS
PREFS
MORE
HIDE
HOME
PHONE
ZOOM
TV
WWW
EMAIL
CPU
AUTO
RADIO
HIDE
HOME
CALL
LIST
MESSAGES
BILL
USER
PIPS
PREFS
MORE
HIDE
HOME
PHONE
ZOOM
TV
WWW
EMAIL
CPU
AUTO
RADIO
HIDE
HOME
TV1
TV2
TV3
BROWS
APP1
APP2
MENU
PREFS
HIDE
HOME
LIGHTS
SECURITY
MONITORS
BABY
INTERCOM
PIPS
PREFS
MORE
HIDE
HOME
AM/FM
CASSETTE
CD
VOLUME
MUTE
PIPS
PREFS
MORE
HIDE
HOME
DESKTOP
OS
APP
DOC
MACROS
PIPS
PREFS
MORE
HIDE
HOME
NEW
GET
LIST
LOGON
USER
PIPS
PREFS
MORE
HIDE

Figure 28(u)

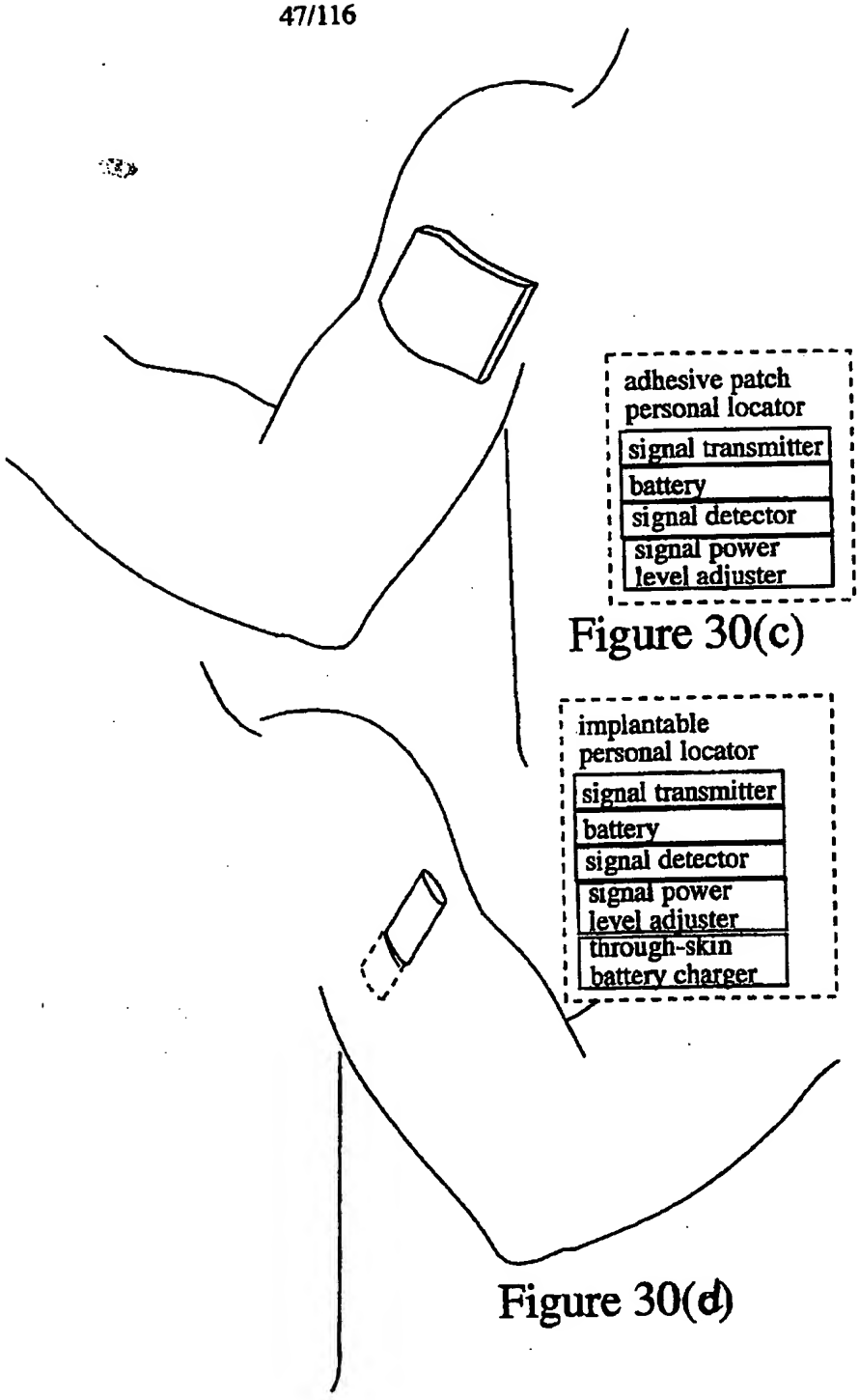


Figure 30(c)

Figure 30(d)

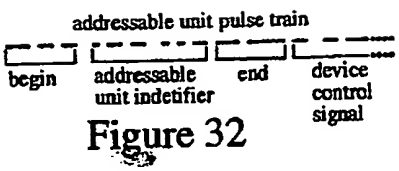


Figure 32

Figure 33

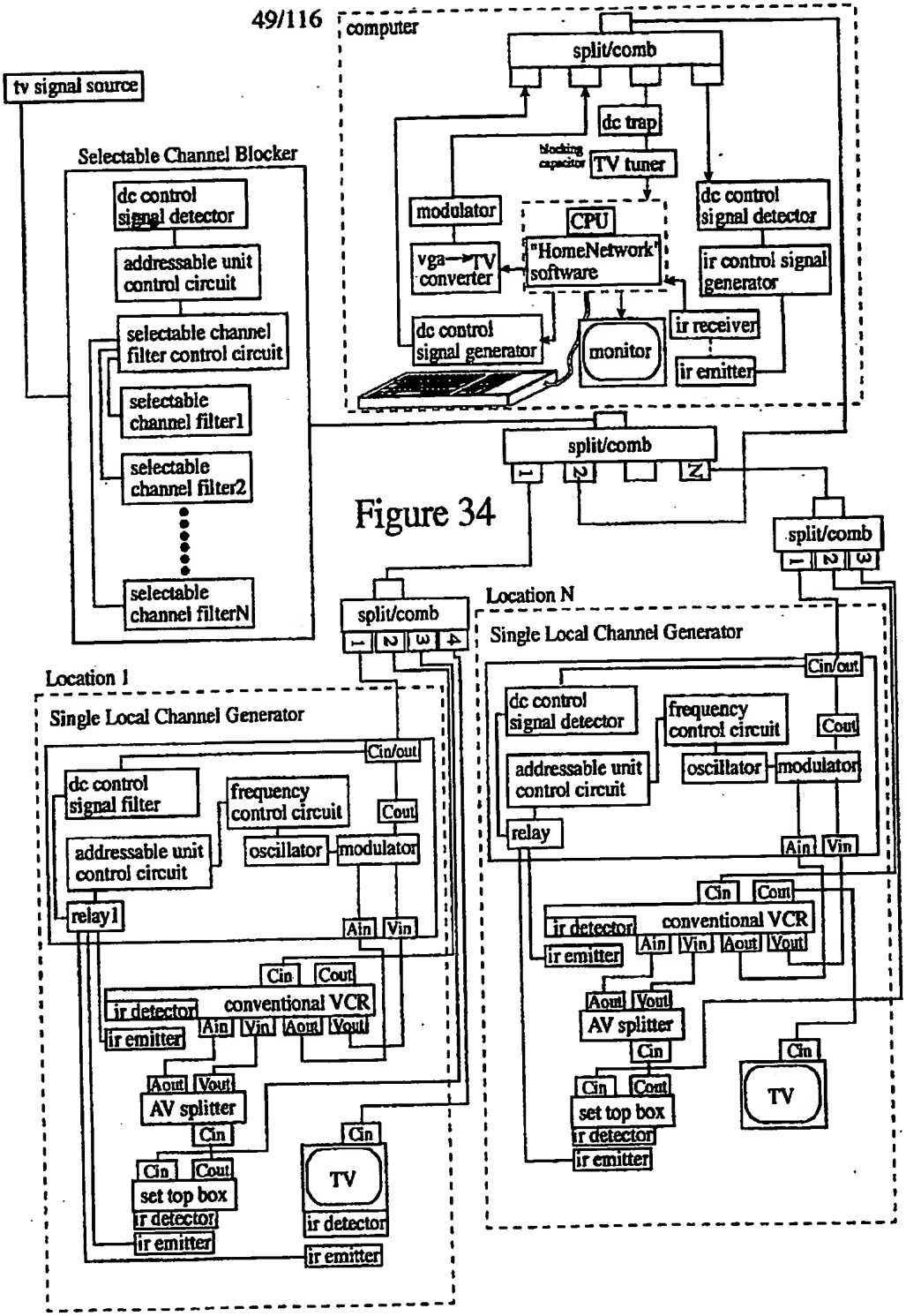

computer
split/comb
dc trap
blocking capacitor
TV tuner
modulator
CPU
vga→TV converter
"HomeNetwork" software
dc control signal detector
ir control signal generator
dc control signal generator
monitor
ir receiver
ir emitter
tv signal source
Selectable Channel Blocker
dc control signal detector
addressable unit control circuit
selectable channel filter control circuit
selectable channel filter1
selectable channel filter2
selectable channel filterN
split/comb
split/comb
split/comb
Location 1
Single Local Channel Generator
Cin/out
dc control signal filter
frequency control circuit
Cout
addressable unit control circuit
oscillator
modulator
relay1
Ain
Vin
Cin
Cout
ir detector
conventional VCR
ir emitter
Ain
Vin
Aout
Vout
Aout
Vout
AV splitter
Cin
Cin
Cout
set top box
ir detector
ir emitter
Cin
TV
ir detector
ir emitter
Location N
Single Local Channel Generator
Cin/out
dc control signal detector
frequency control circuit
Cout
addressable unit control circuit
oscillator
modulator
relay
Ain
Vin
Cin
Cout
ir detector
conventional VCR
ir emitter
Ain
Vin
Aout
Vout
Aout
Vout
AV splitter
Cin
Cin
Cin
Cout
set top box
ir detector
ir emitter
TV

Figure 34

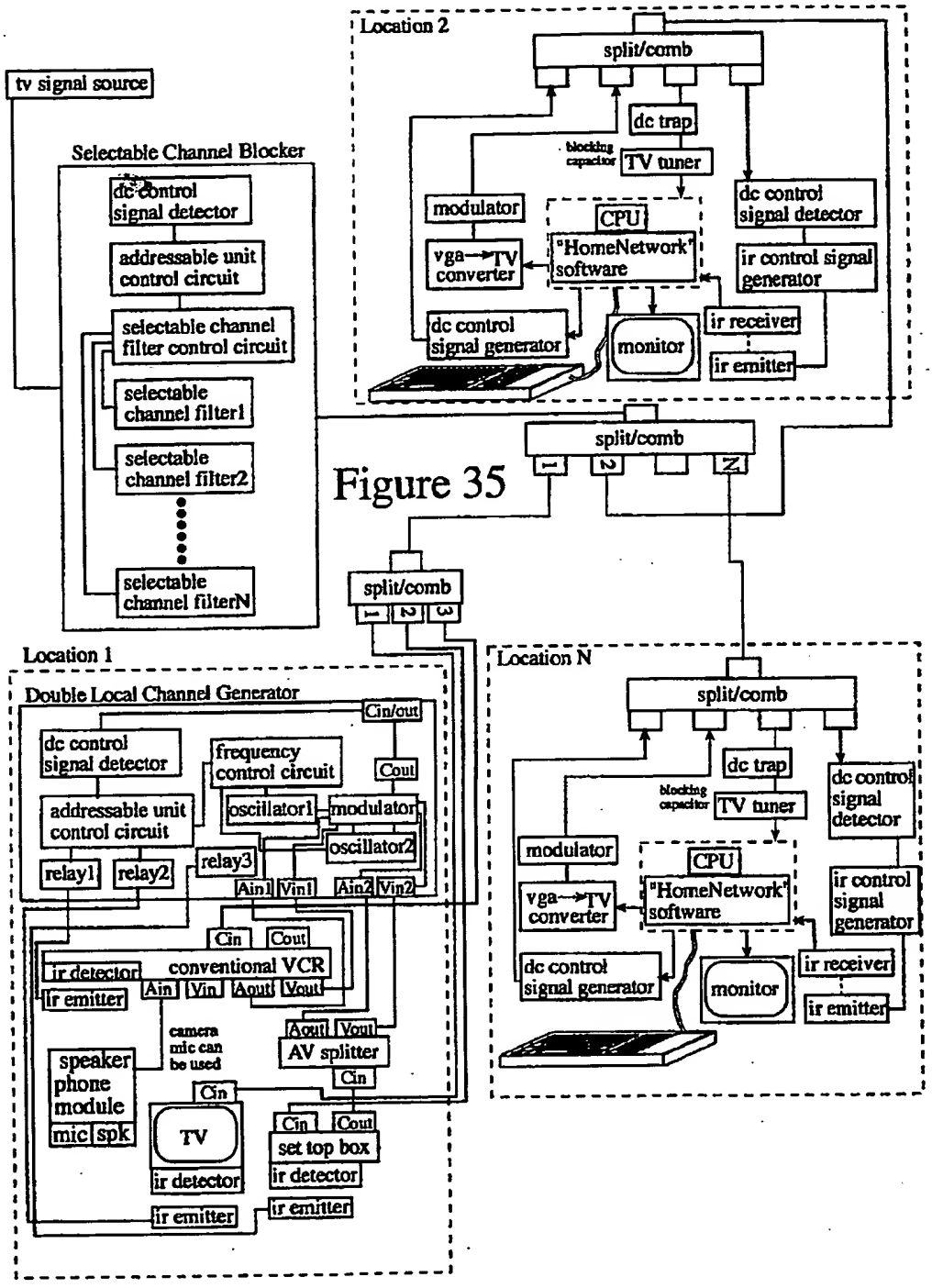

tv signal source
Selectable Channel Blocker
dc control signal detector
addressable unit control circuit
selectable channel filter control circuit
selectable channel filter1
selectable channel filter2
selectable channel filterN
Location 2
split/comb
dc trap
blocking capacitor
TV tuner
modulator
CPU
vga→TV converter
"HomeNetwork" software
dc control signal generator
monitor
dc control signal detector
ir control signal generator
ir receiver
ir emitter
split/comb
split/comb
Location 1
Double Local Channel Generator
Cin/out
dc control signal detector
frequency control circuit
Cout
addressable unit control circuit
oscillator1
modulator
oscillator2
relay1
relay2
relay3
Ain1
Vin1
Ain2
Vin2
Cin
Cout
ir detector
conventional VCR
ir emitter
Ain
Vin
Aout
Vout
camera mic can be used
AV splitter
speaker phone module
mic
spk
TV
set top box
ir detector
ir emitter
Location N
split/comb
dc trap
blocking capacitor
TV tuner
dc control signal detector
modulator
CPU
vga→TV converter
"HomeNetwork" software
ir control signal generator
dc control signal generator
monitor
ir receiver
ir emitter

Figure 35

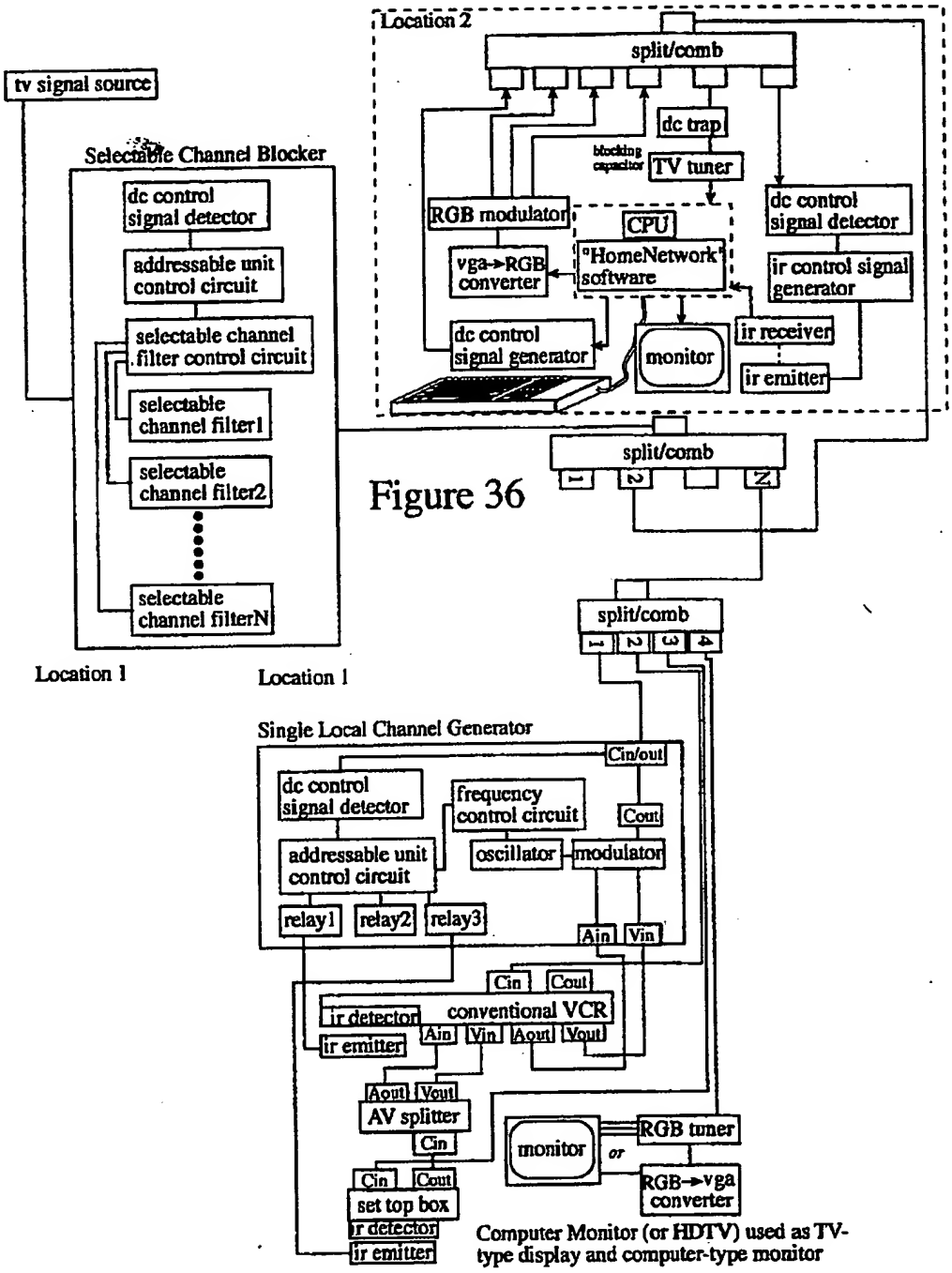


Figure 36

Computer Monitor (or HDTV) used as TV-type display and computer-type monitor

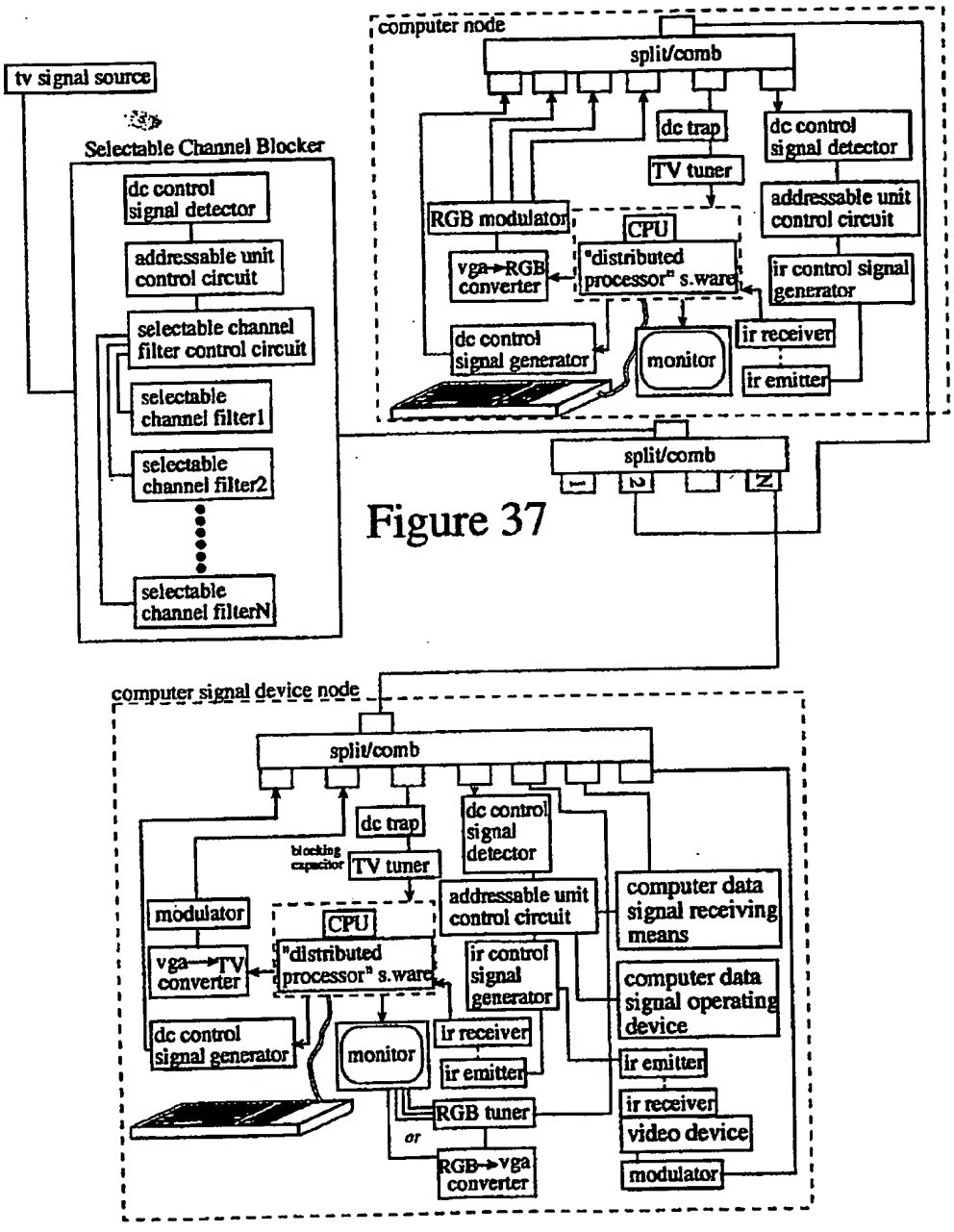

tv signal source
Selectable Channel Blocker
dc control signal detector
addressable unit control circuit
selectable channel filter control circuit
selectable channel filter1
selectable channel filter2
selectable channel filterN
computer node
split/comb
dc trap
dc control signal detector
TV tuner
addressable unit control circuit
RGB modulator
CPU
vga→RGB converter
"distributed processor" s.ware
ir control signal generator
dc control signal generator
monitor
ir receiver
ir emitter
split/comb
computer signal device node
split/comb
dc trap
dc control signal detector
blocking capacitor
TV tuner
addressable unit control circuit
computer data signal receiving means
modulator
CPU
vga→TV converter
"distributed processor" s.ware
ir control signal generator
computer data signal operating device
dc control signal generator
monitor
ir receiver
ir emitter
ir emitter
ir receiver
RGB tuner
video device
or
RGB→vga converter
modulator

Figure 37

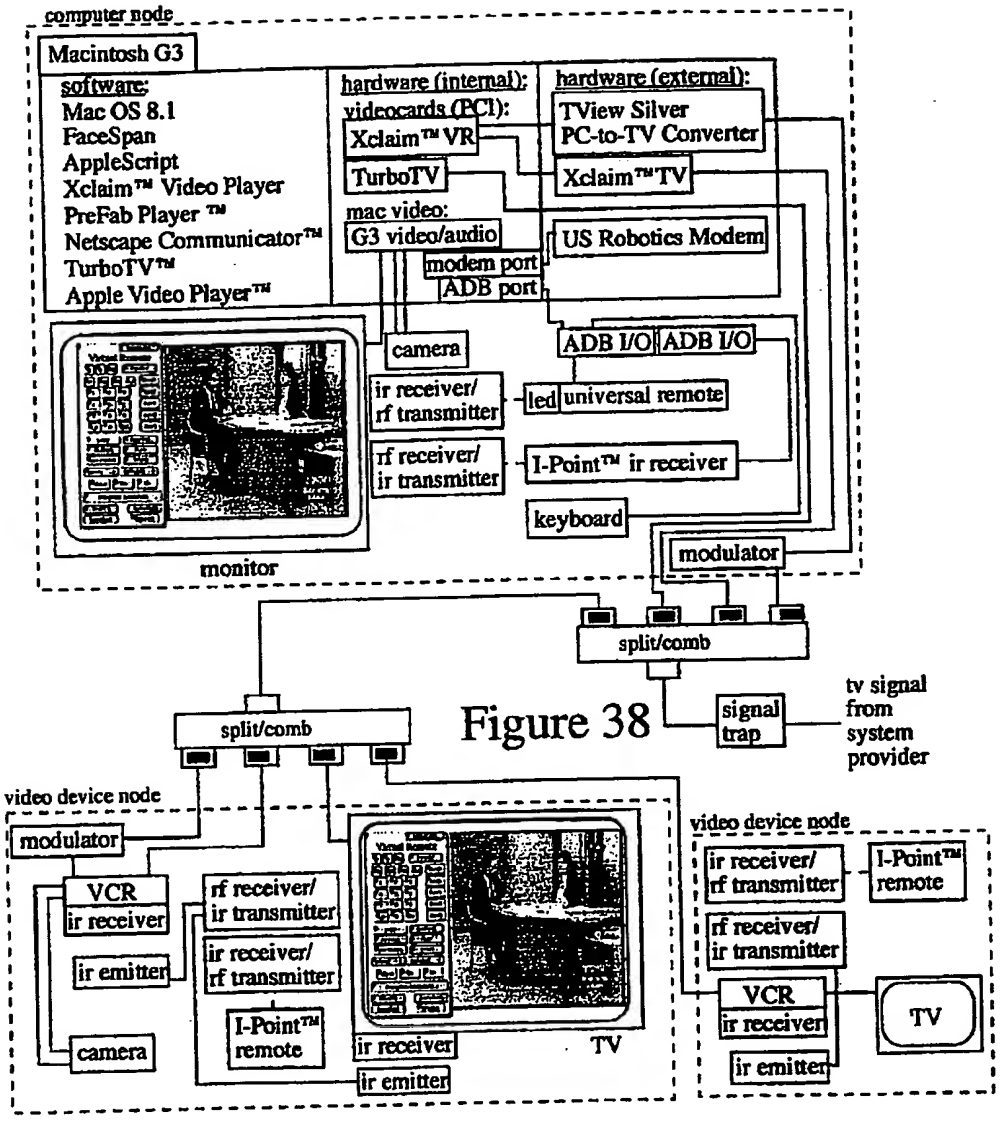

computer node
Macintosh G3
software:
Mac OS 8.1
FaceSpan
AppleScript
Xclaim™ Video Player
PreFab Player ™
Netscape Communicator™
TurboTV™
Apple Video Player™
hardware (internal):
videocards (PCI):
Xclaim™ VR
TurboTV
mac video:
G3 video/audio
modem port
ADB port
hardware (external):
TView Silver
PC-to-TV Converter
Xclaim™TV
US Robotics Modem
ADB I/O
ADB I/O
camera
ir receiver/
rf transmitter
led
universal remote
rf receiver/
ir transmitter
I-Point™ ir receiver
keyboard
modulator
monitor
split/comb
split/comb
signal
trap
tv signal
from
system
provider
video device node
modulator
VCR
ir receiver
ir emitter
camera
rf receiver/
ir transmitter
ir receiver/
rf transmitter
I-Point™
remote
ir receiver
ir emitter
TV
video device node
ir receiver/
rf transmitter
I-Point™
remote
rf receiver/
ir transmitter
VCR
ir receiver
ir emitter
TV

Figure 38

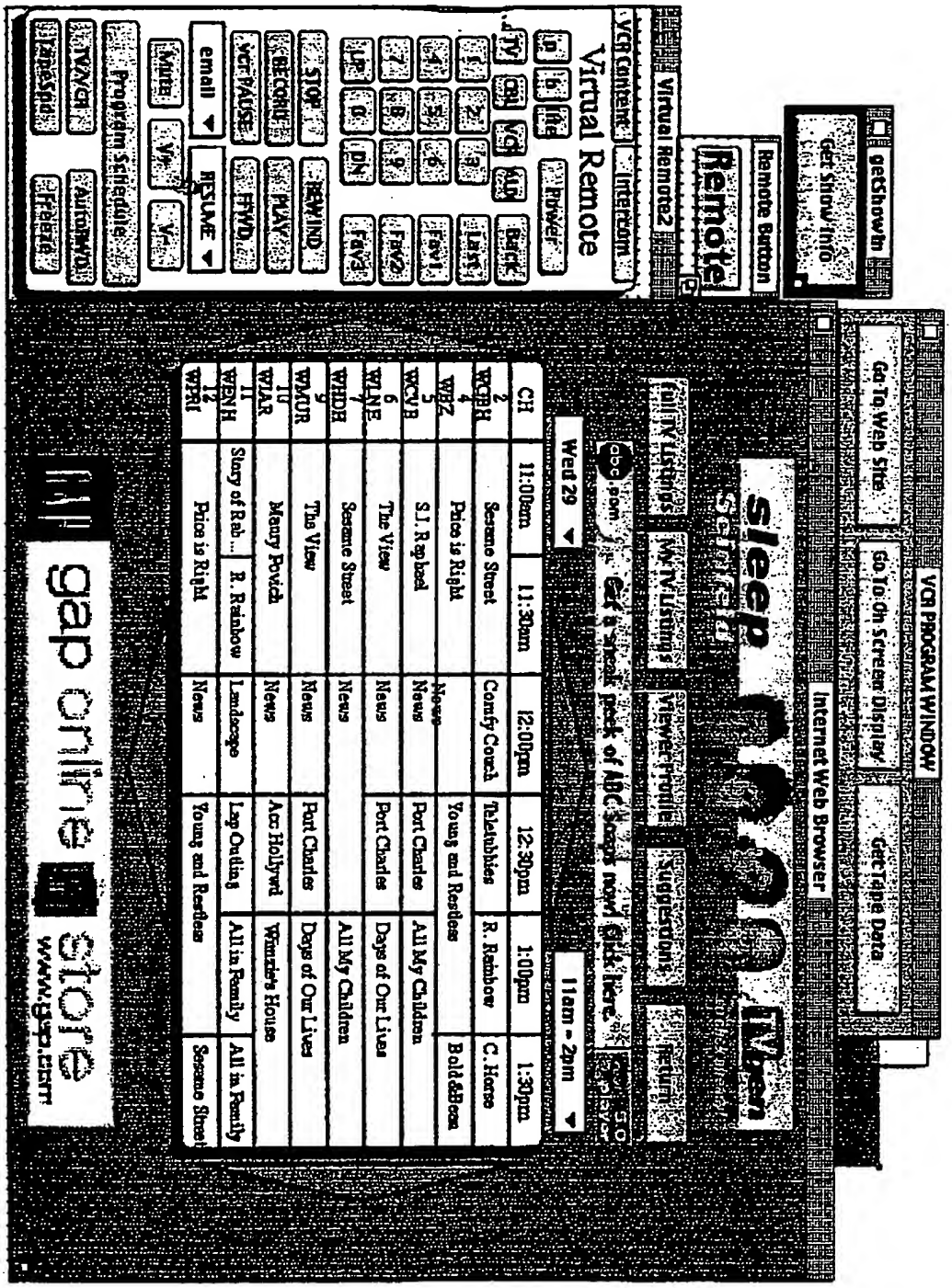

getShowInfo
Get Show Info
Remote Button
Remote
Virtual Remote2
VCR Content
Intercom
Virtual Remote
Power
TV
CBL
VCR
AUD
Back
Last
Fav1
Fav2
Fav3
STOP
REWIND
RECORD
PLAY
VCR PAUSE
FFWD
email
RESUME
Mute
Program Selection
TV/VCR
Autotune
Freeze
Message
VCR PROGRAM WINDOW
Go To Web Site
Go To On Screen Display
Get Tape Data
Internet Web Browser
sleep
Full TV Listings
My TV Listings
Viewer Profile
Suggestions
Return
West 29
11am - 2pm
CH
11:00am
11:30am
12:00pm
12:30pm
1:00pm
1:30pm
Sesame Street
Comfy Couch
Teletubbies
R. Rainbow
C. Horse
Price is Right
Young and Restless
Bold&Beau
S.J. Raphael
All My Children
The View
Port Charles
Days of Our Lives
Maury Povich
Ant Hollywd
Winnie's House
Story of Rob...
R. Rainbow
Landscape
Lap Outing
All in Family
Price is Right
News
Young and Restless
Sesame Street
gap online
store
www.gap.com

Figure 39

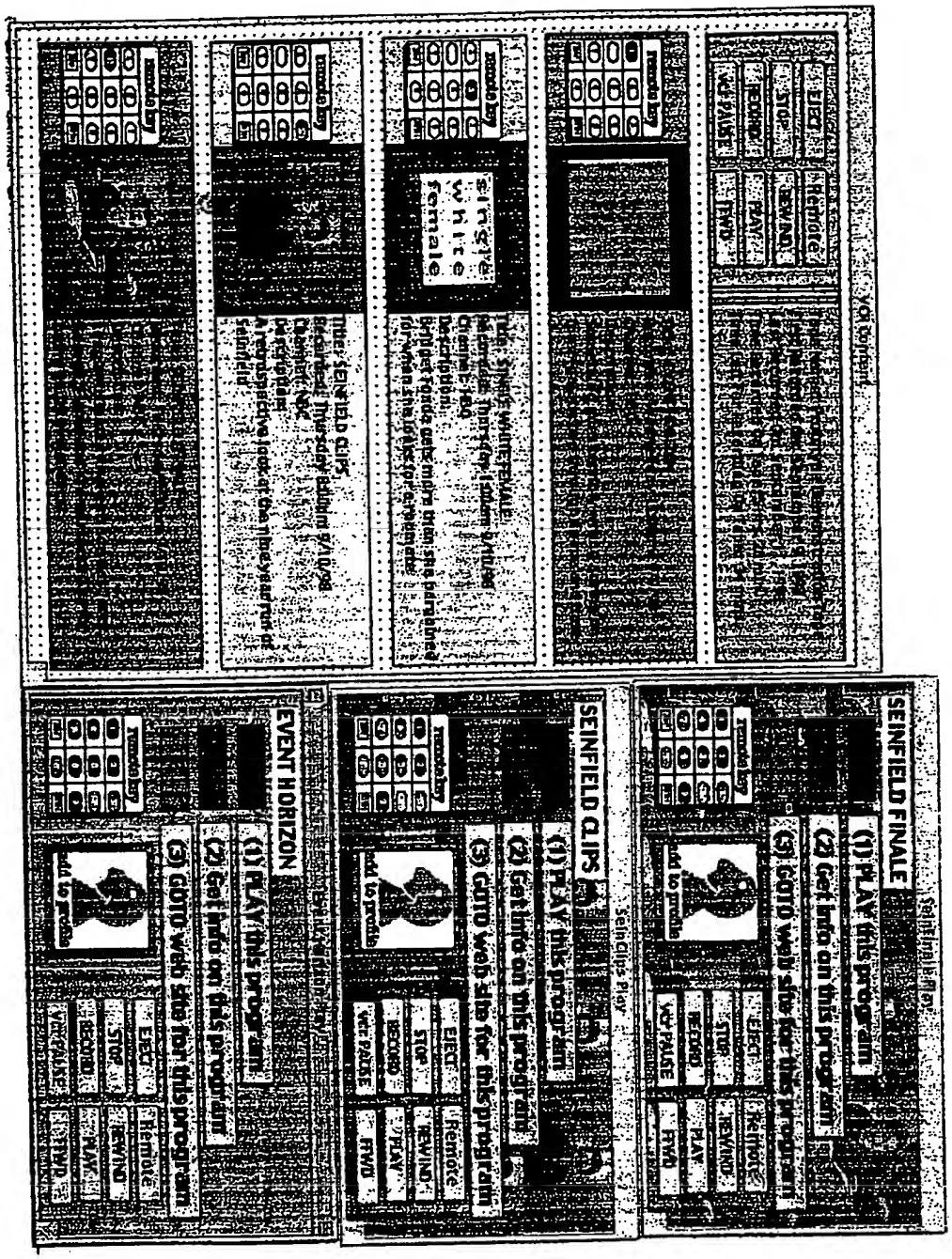

SEINFIELD FINALE
(1) PLAY this program
(2) Get info on this program
(3) GOTO web site for this program
SEINFIELD CLIPS
(1) PLAY this program
(2) Get info on this program
(3) GOTO web site for this program
EVENT HORIZON
(1) PLAY this program
(2) Get info on this program
(3) GOTO web site for this program
Remote
EJECT
STOP
REWIND
RECORD
PLAY
VCR PAUSE
FFWD

Figure 40

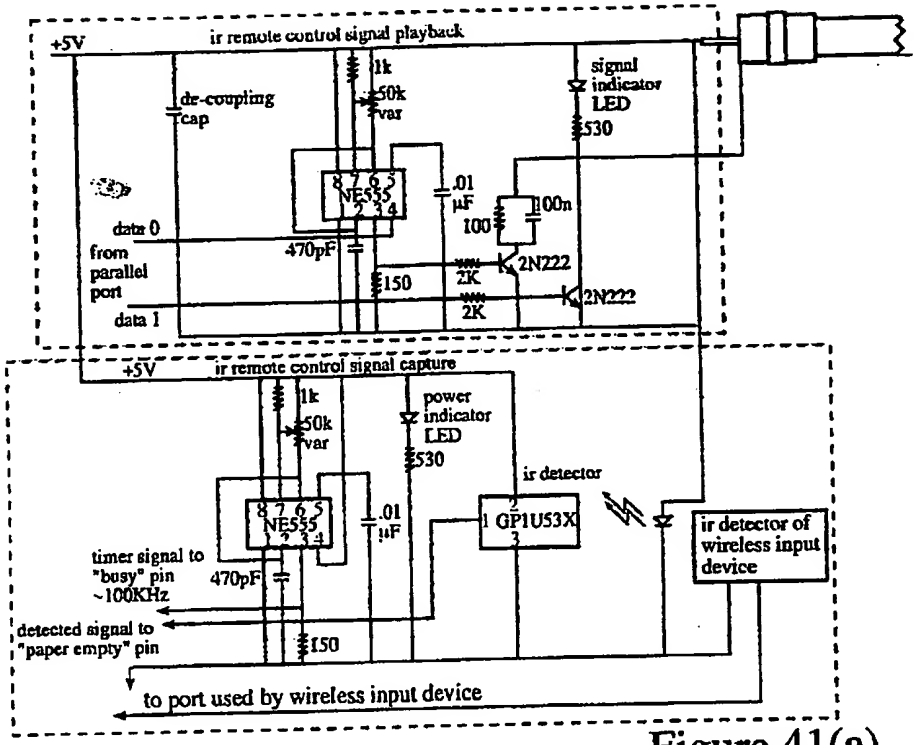


Figure 41(a)

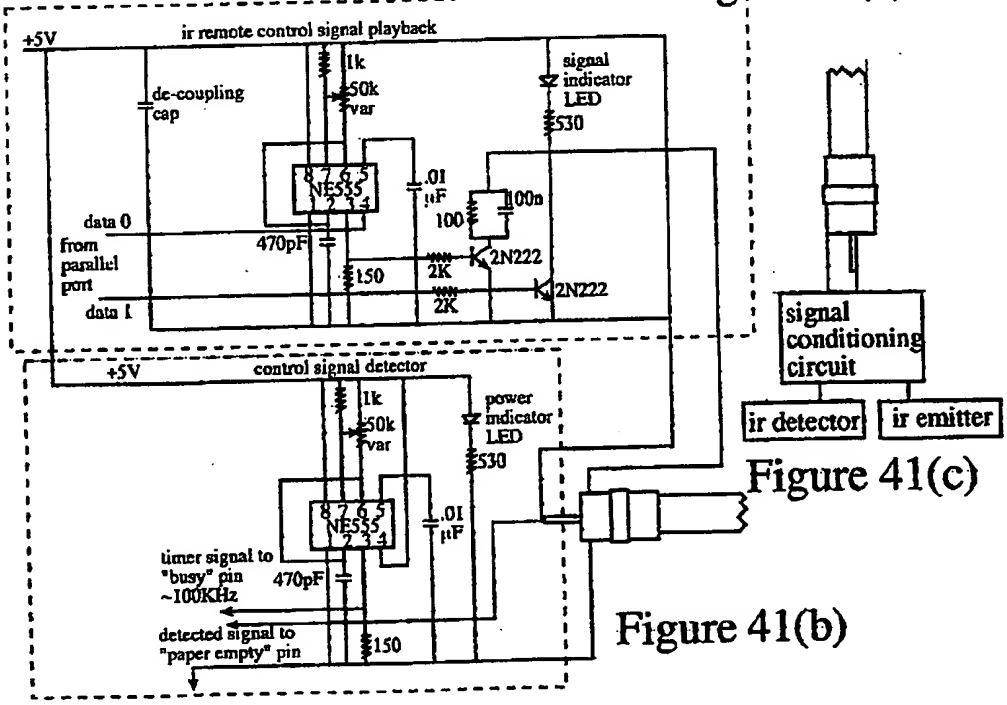


Figure 41(c)

Figure 41(b)

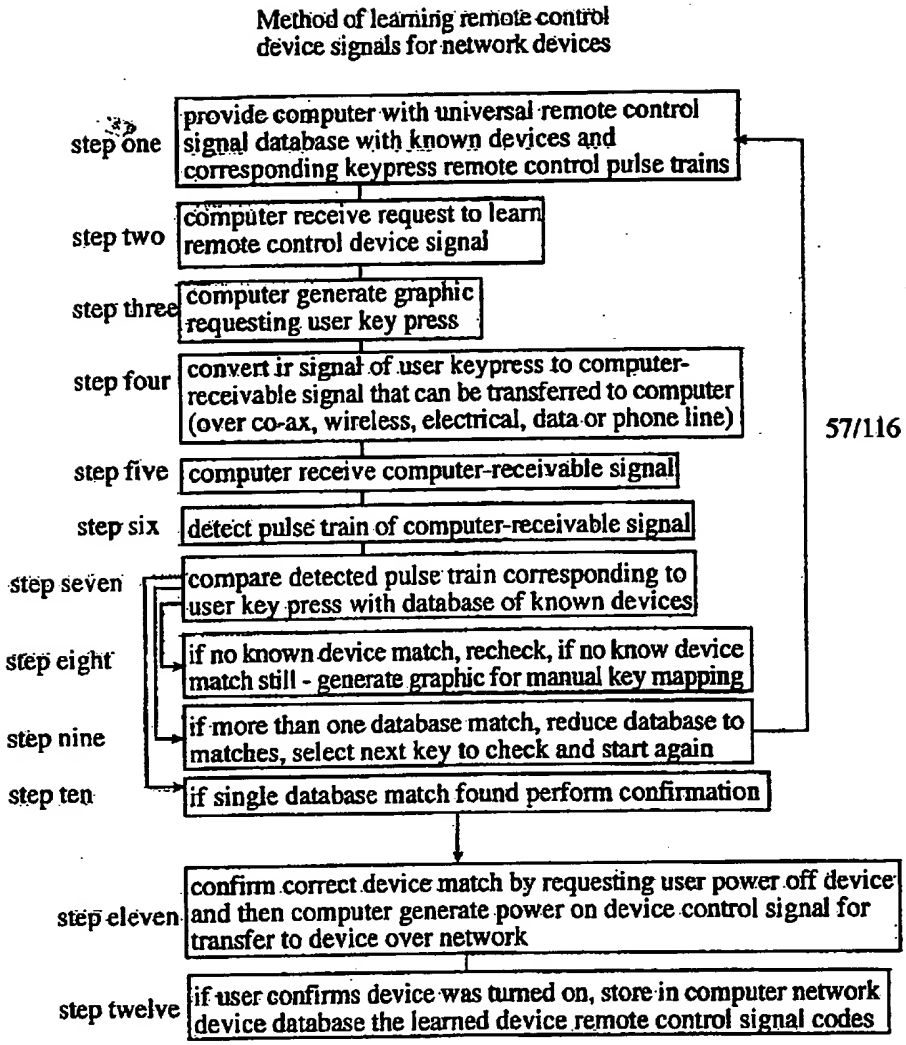

Method of learning remote control device signals for network devices
step one
provide computer with universal remote control signal database with known devices and corresponding keypress remote control pulse trains
step two
computer receive request to learn remote control device signal
step three
computer generate graphic requesting user key press
step four
convert ir signal of user keypress to computer-receivable signal that can be transferred to computer (over co-ax, wireless, electrical, data or phone line)
step five
computer receive computer-receivable signal
step six
detect pulse train of computer-receivable signal
step seven
compare detected pulse train corresponding to user key press with database of known devices
step eight
if no known device match, recheck, if no know device match still - generate graphic for manual key mapping
step nine
if more than one database match, reduce database to matches, select next key to check and start again
step ten
if single database match found perform confirmation
step eleven
confirm correct device match by requesting user power off device and then computer generate power on device control signal for transfer to device over network
step twelve
if user confirms device was turned on, store in computer network device database the learned device remote control signal codes
57/116

Figure 41(d)

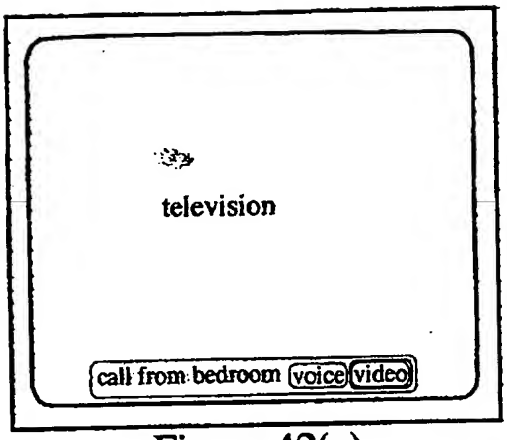


Figure 42(a)

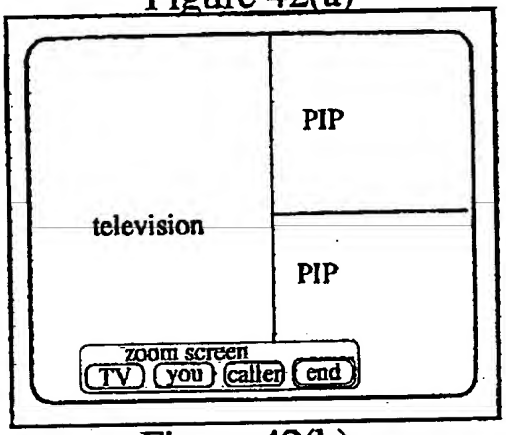


Figure 42(b)

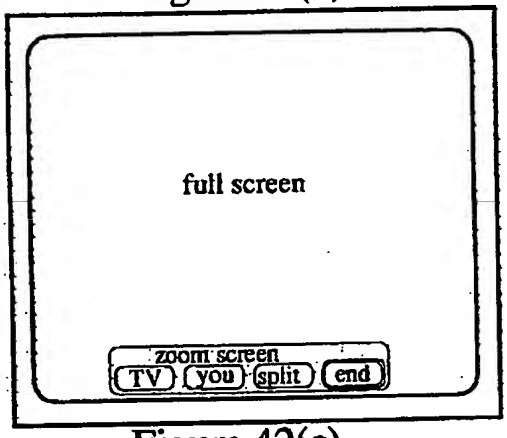
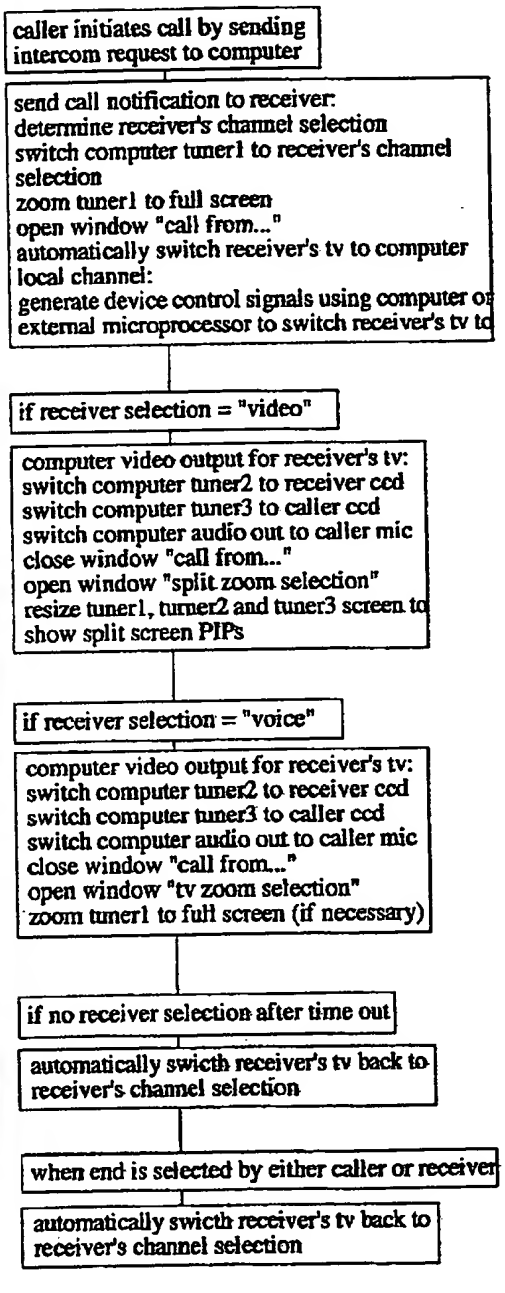


Figure 42(c)

Video Intercom Figure 43



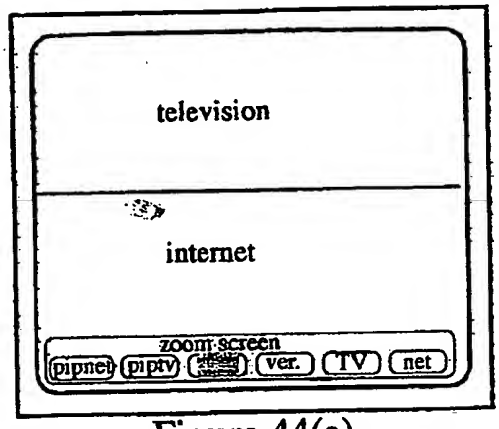


Figure 44(a)

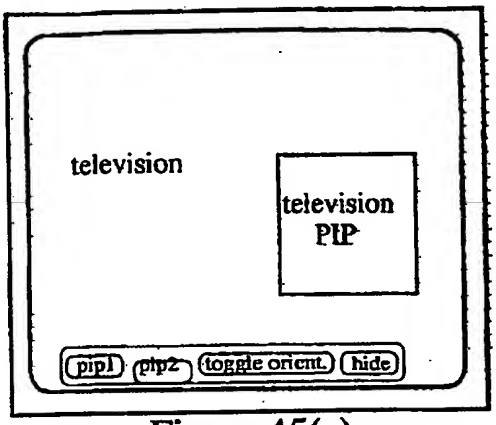


Figure 45(a)

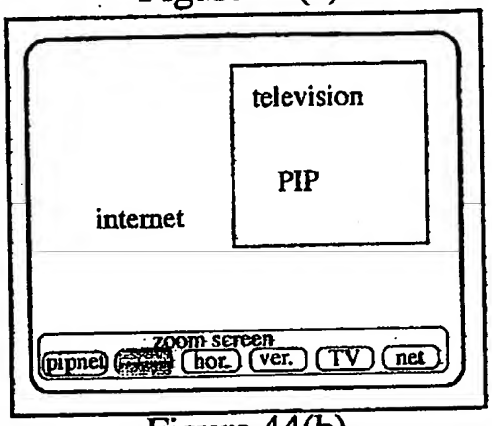


Figure 44(b)

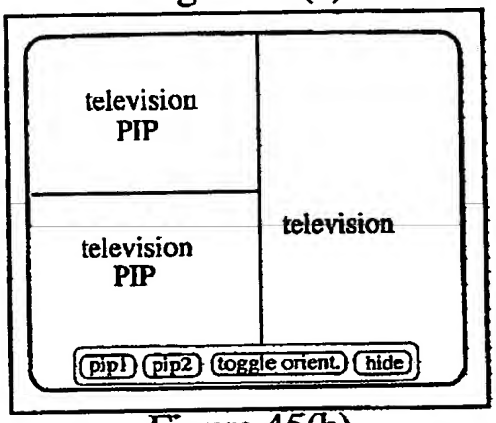


Figure 45(b)

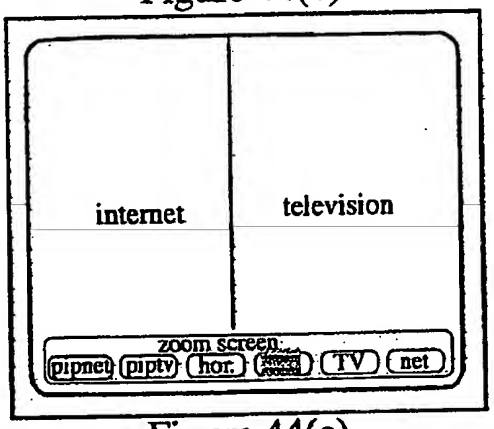


Figure 44(c)

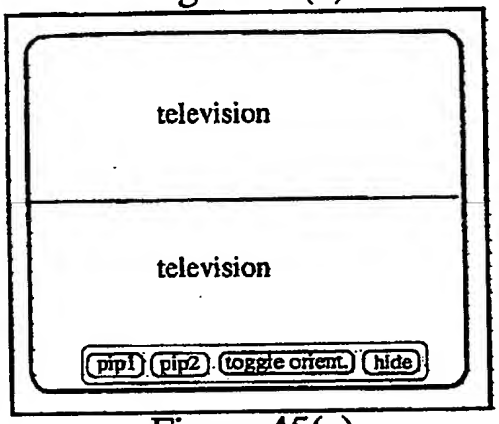


Figure 45(c)

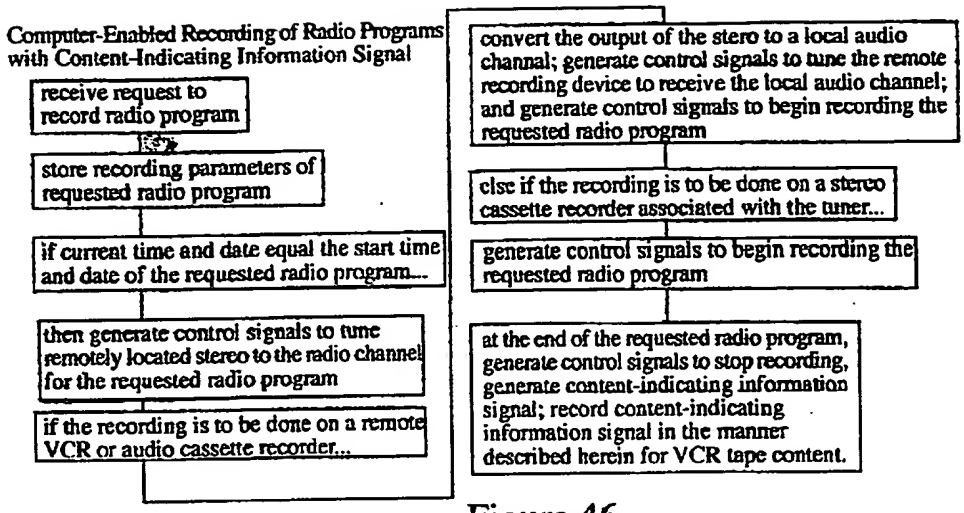


Figure 46

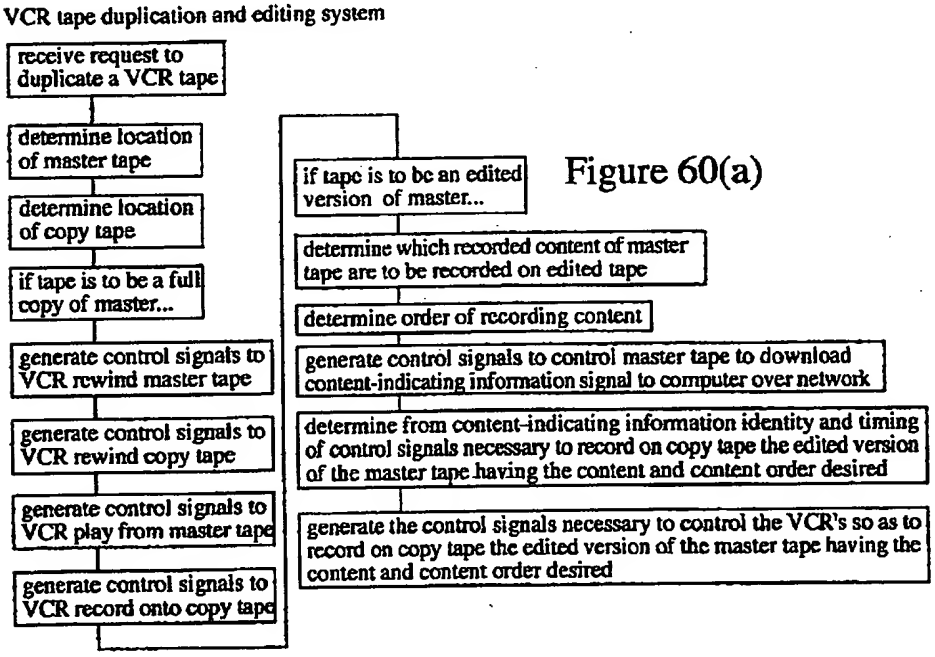


Figure 60(a)

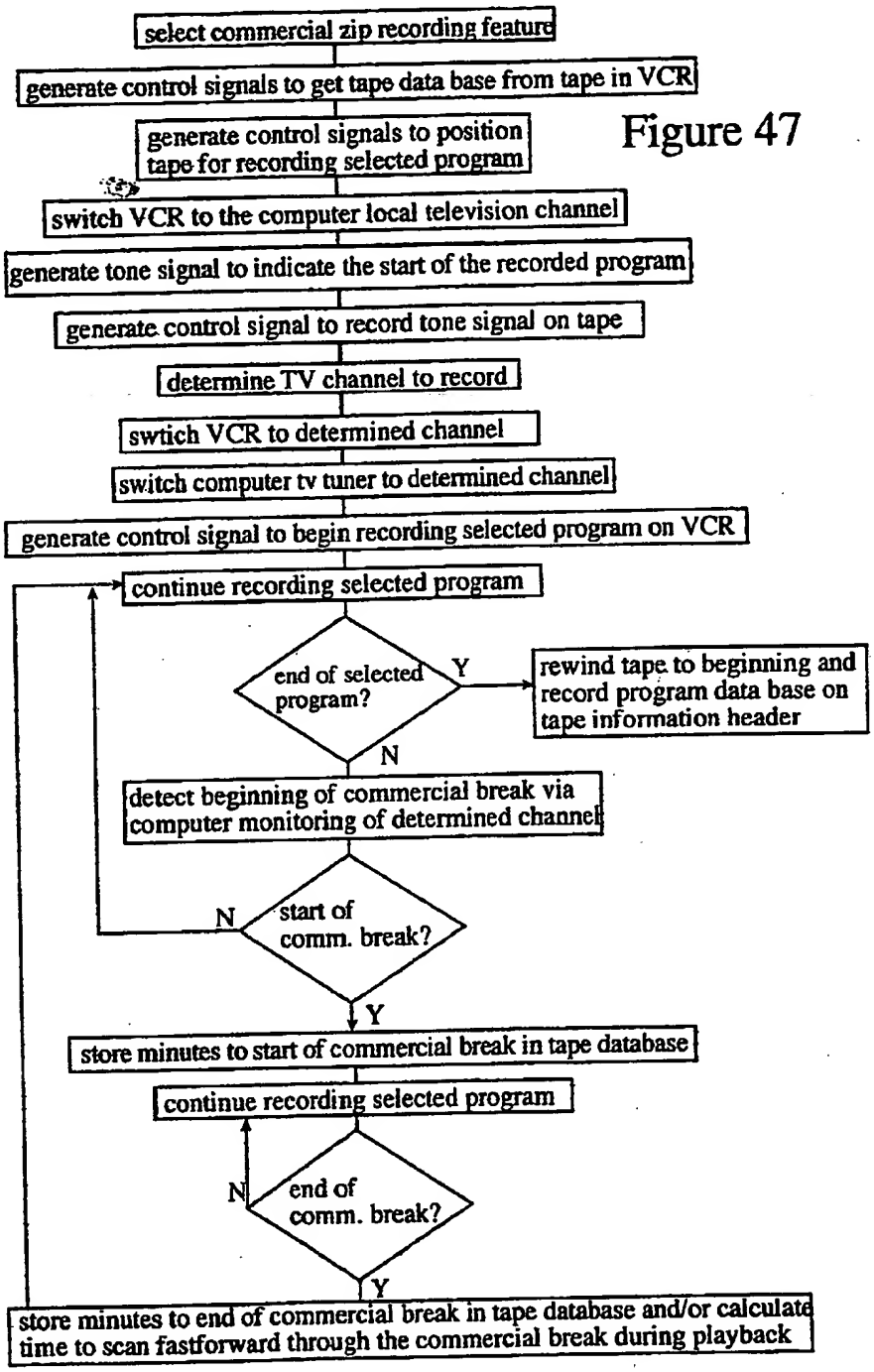

select commercial zip recording feature
generate control signals to get tape data base from tape in VCR
generate control signals to position tape for recording selected program
switch VCR to the computer local television channel
generate tone signal to indicate the start of the recorded program
generate control signal to record tone signal on tape
determine TV channel to record
swtich VCR to determined channel
switch computer tv tuner to determined channel
generate control signal to begin recording selected program on VCR
continue recording selected program
end of selected program?
Y
rewind tape to beginning and record program data base on tape information header
N
detect beginning of commercial break via computer monitoring of determined channel
N
start of comm. break?
Y
store minutes to start of commercial break in tape database
continue recording selected program
N
end of comm. break?
Y
store minutes to end of commercial break in tape database and/or calculate time to scan fastforward through the commercial break during playback

Figure 47

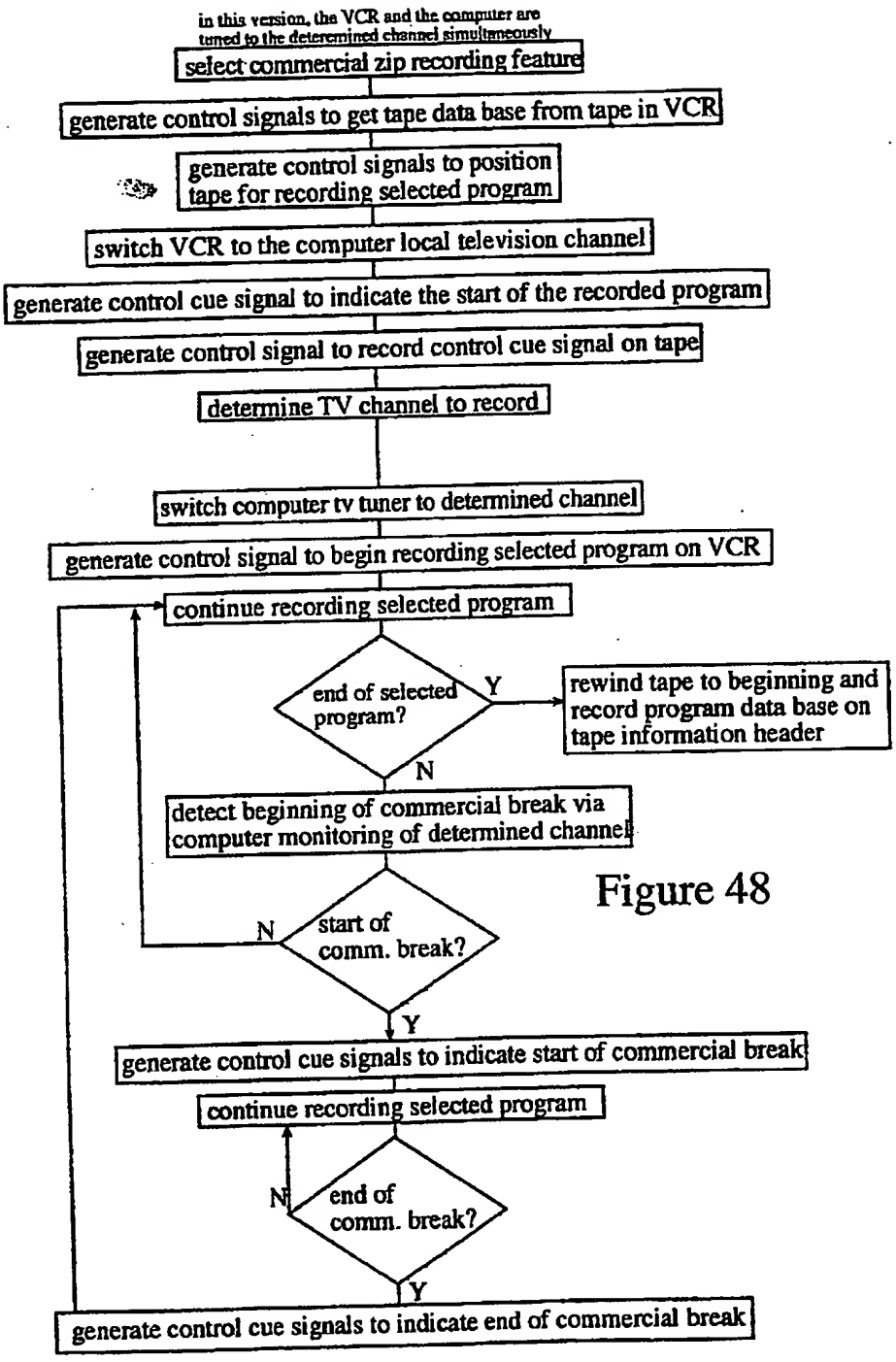

in this version, the VCR and the computer are tuned to the determined channel simultaneously
select commercial zip recording feature
generate control signals to get tape data base from tape in VCR
generate control signals to position tape for recording selected program
switch VCR to the computer local television channel
generate control cue signal to indicate the start of the recorded program
generate control signal to record control cue signal on tape
determine TV channel to record
switch computer tv tuner to determined channel
generate control signal to begin recording selected program on VCR
continue recording selected program
end of selected program?
Y
rewind tape to beginning and record program data base on tape information header
N
detect beginning of commercial break via computer monitoring of determined channel
N
start of comm. break?
Y
generate control cue signals to indicate start of commercial break
continue recording selected program
N
end of comm. break?
Y
generate control cue signals to indicate end of commercial break

Figure 48

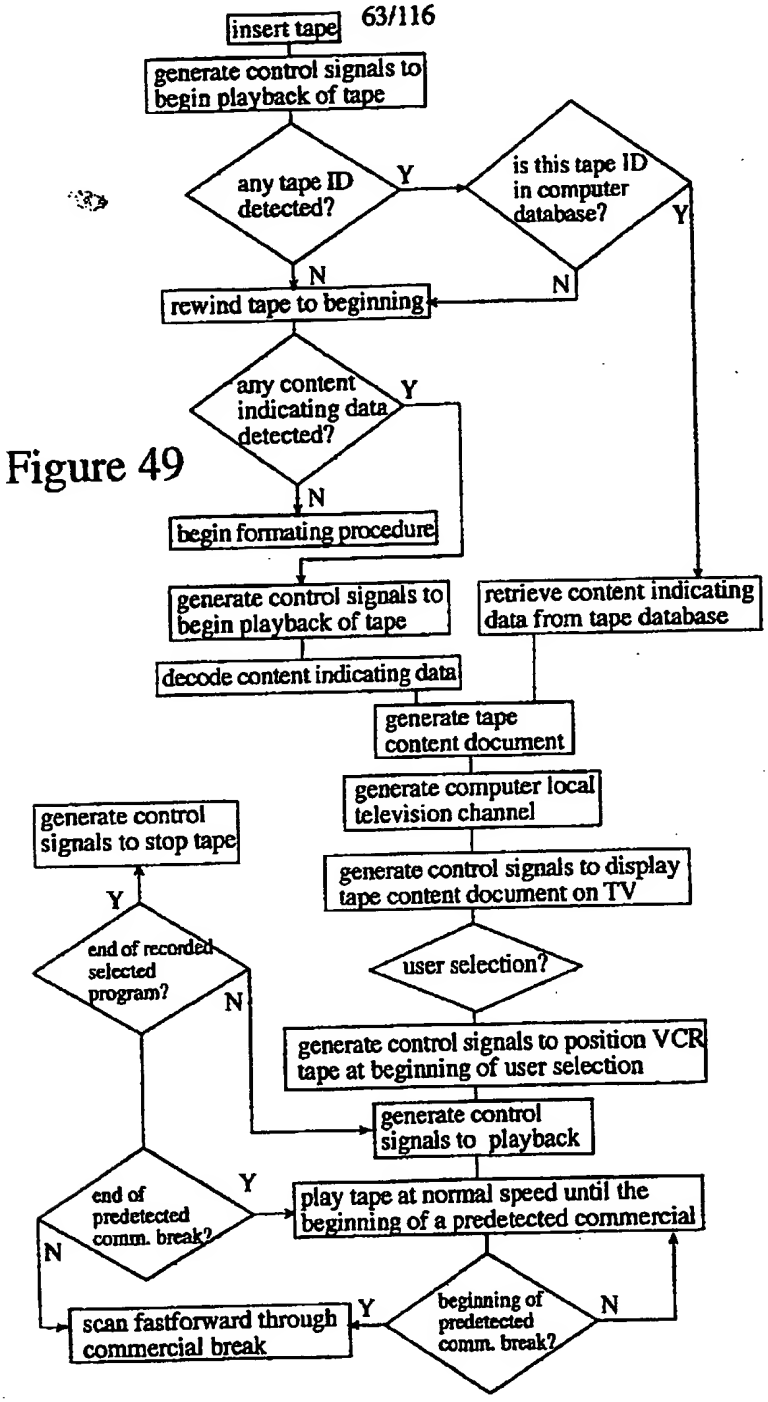

insert tape
generate control signals to begin playback of tape
any tape ID detected?
Y
N
is this tape ID in computer database?
Y
N
rewind tape to beginning
any content indicating data detected?
Y
N
begin formating procedure
generate control signals to begin playback of tape
decode content indicating data
retrieve content indicating data from tape database
generate tape content document
generate computer local television channel
generate control signals to display tape content document on TV
user selection?
generate control signals to position VCR tape at beginning of user selection
generate control signals to playback
play tape at normal speed until the beginning of a predetected commercial
beginning of predetected comm. break?
Y
N
scan fastforward through commercial break
end of predetected comm. break?
Y
N
end of recorded selected program?
Y
N
generate control signals to stop tape

Figure 49

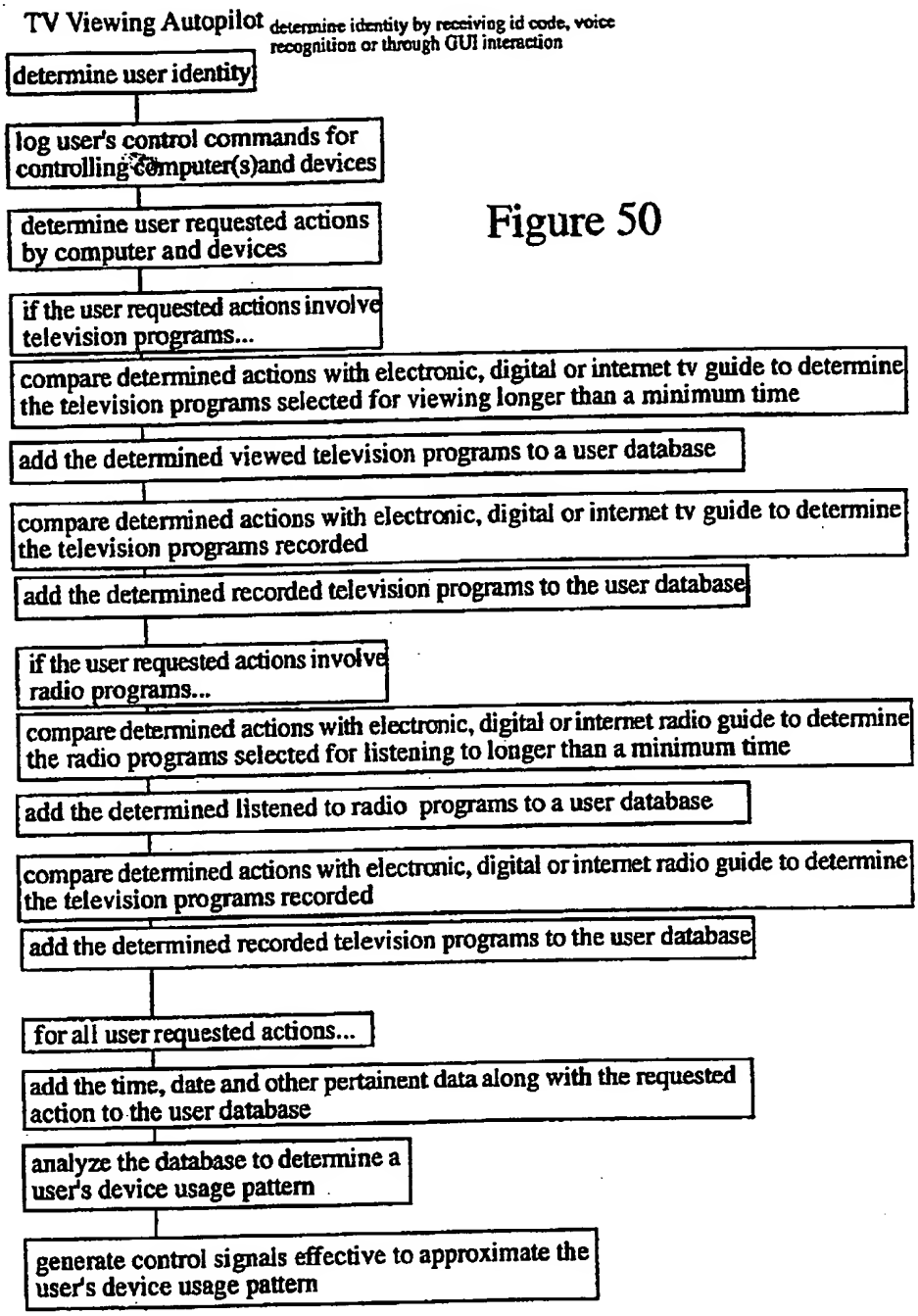

TV Viewing Autopilot
determine identity by receiving id code, voice recognition or through GUI interaction
determine user identity
log user's control commands for controlling computer(s)and devices
determine user requested actions by computer and devices
if the user requested actions involve television programs...
compare determined actions with electronic, digital or internet tv guide to determine the television programs selected for viewing longer than a minimum time
add the determined viewed television programs to a user database
compare determined actions with electronic, digital or internet tv guide to determine the television programs recorded
add the determined recorded television programs to the user database
if the user requested actions involve radio programs...
compare determined actions with electronic, digital or internet radio guide to determine the radio programs selected for listening to longer than a minimum time
add the determined listened to radio programs to a user database
compare determined actions with electronic, digital or internet radio guide to determine the television programs recorded
add the determined recorded television programs to the user database
for all user requested actions...
add the time, date and other pertainent data along with the requested action to the user database
analyze the database to determine a user's device usage pattern
generate control signals effective to approximate the user's device usage pattern

Figure 50

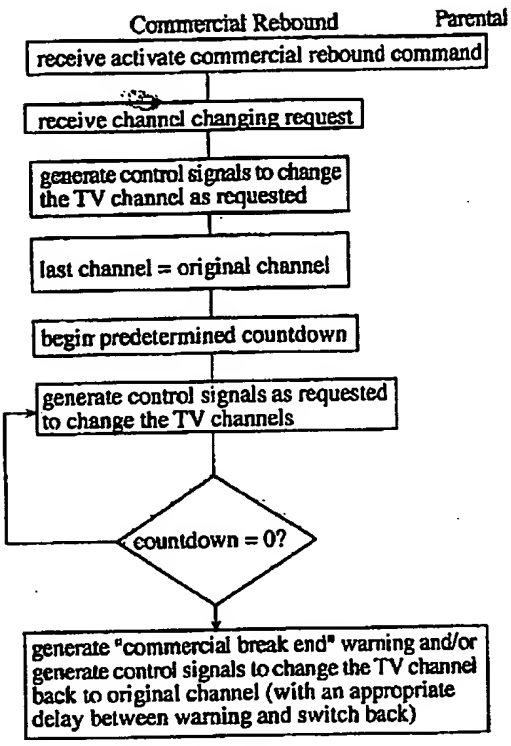


Figure 51

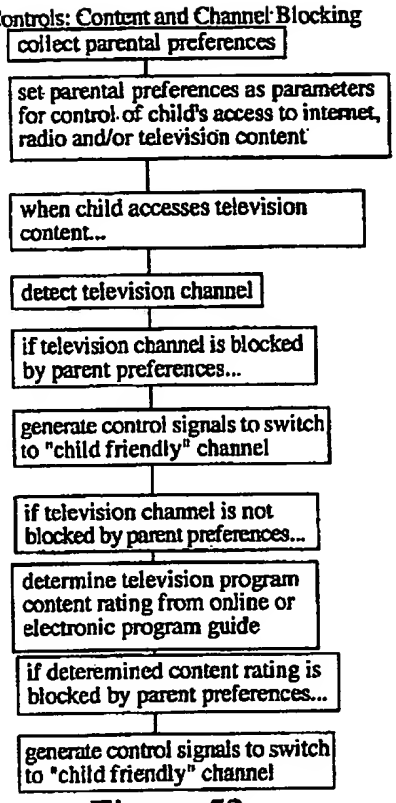


Figure 52

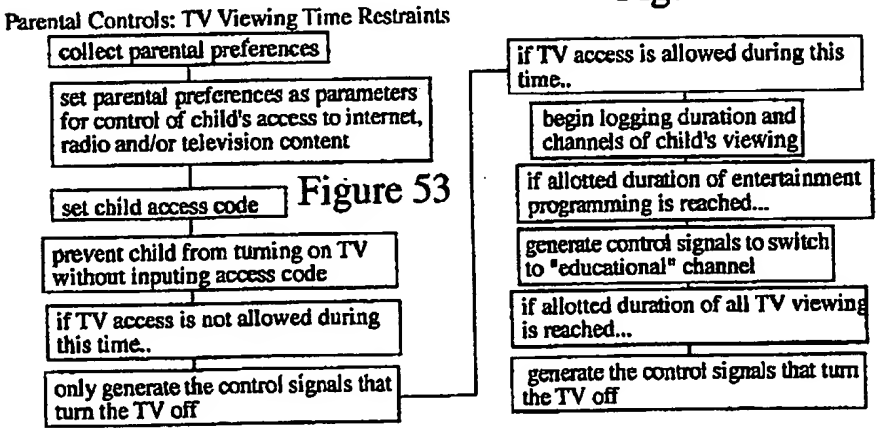


Figure 53

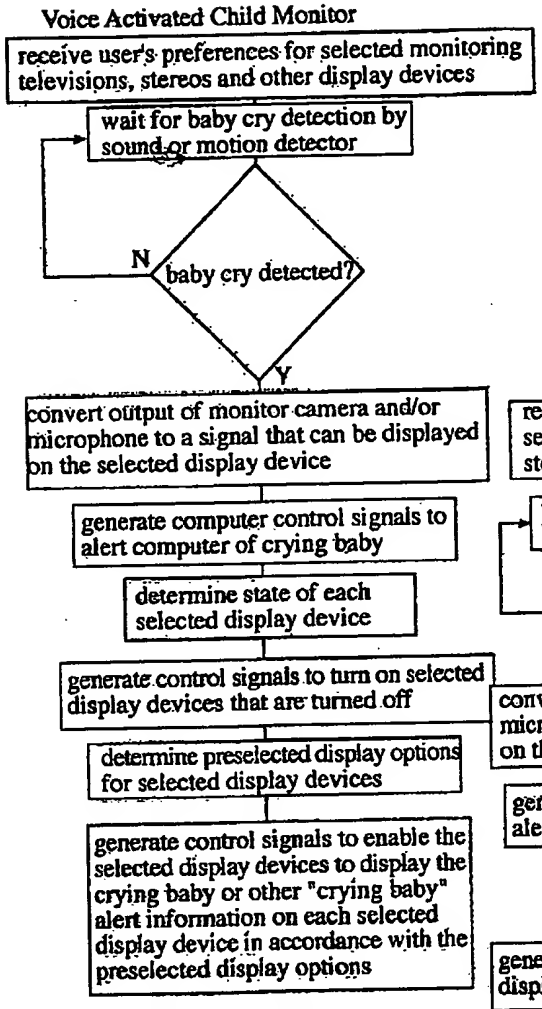


Figure 54

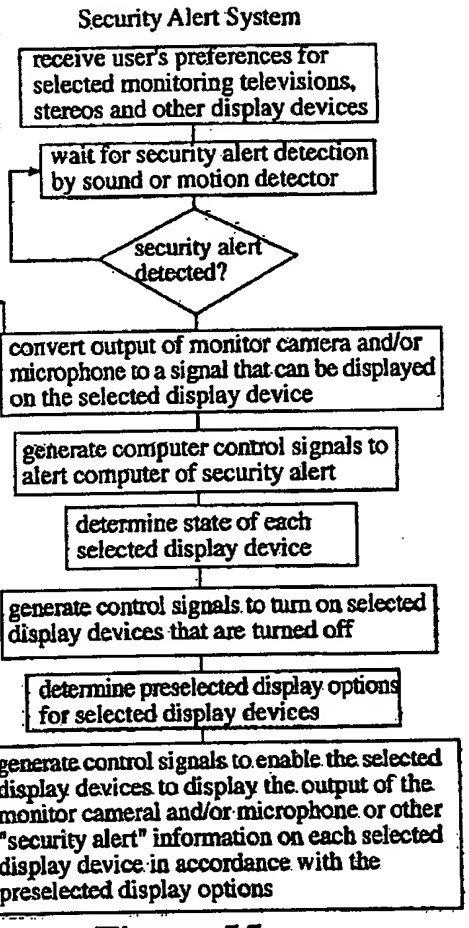


Figure 55

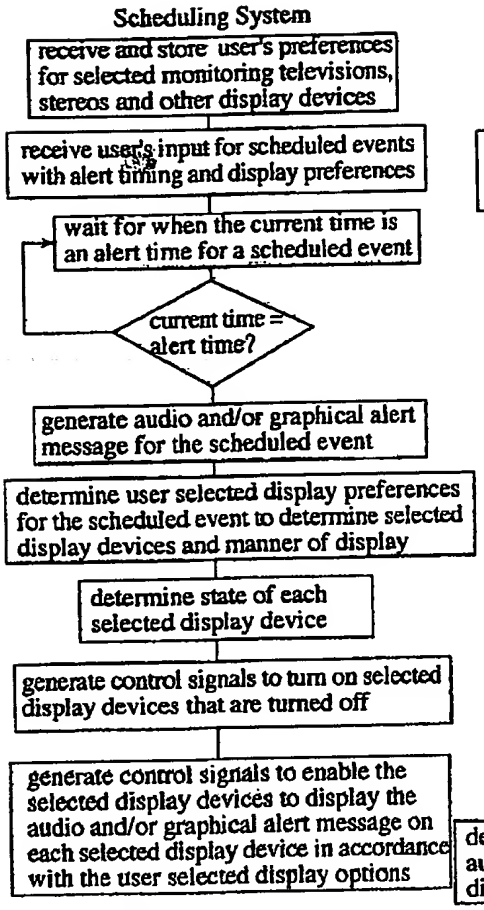


Figure 56

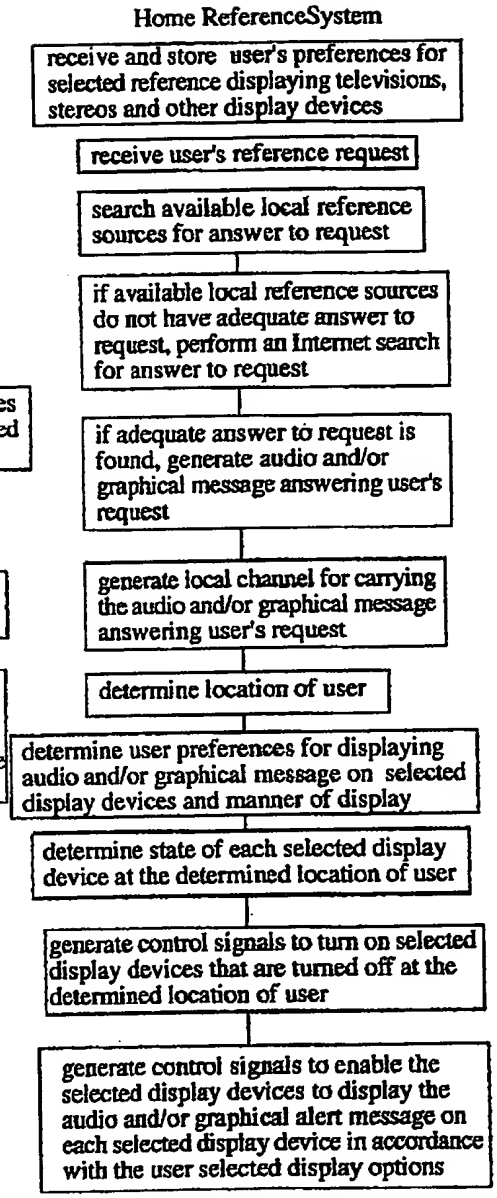


Figure 57

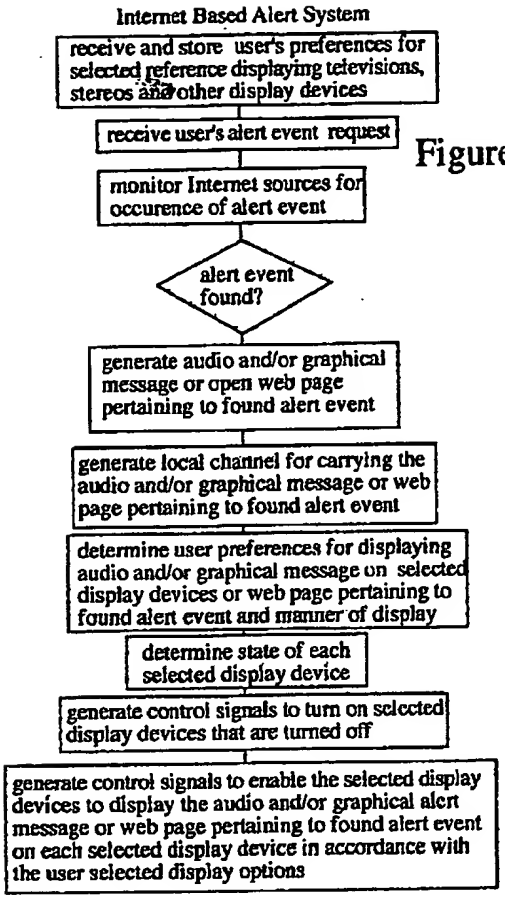


Figure 58

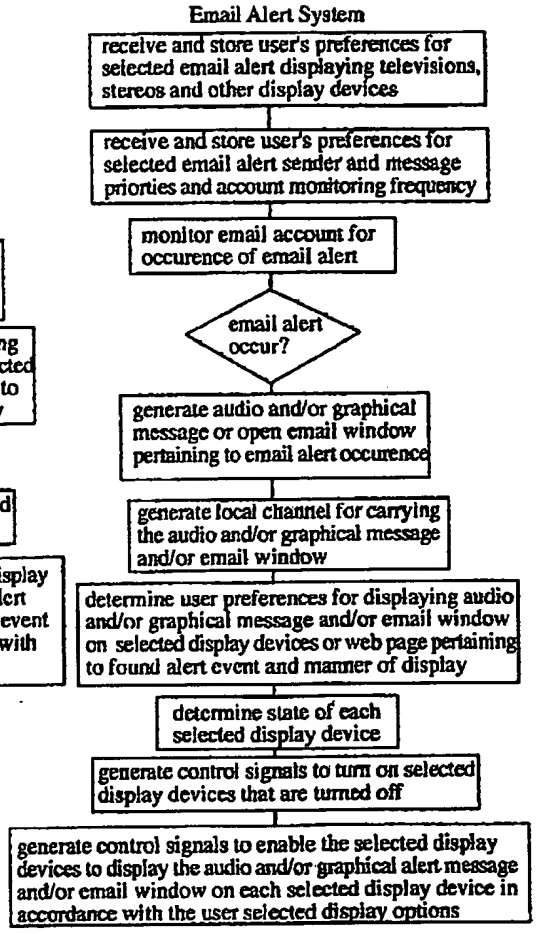


Figure 59

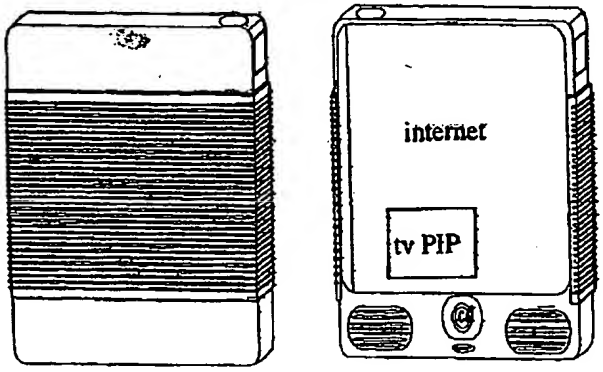


Figure 60(c)

physical motion sensor

pager communication means

wireless modem

storage means

image motion sensor

audio sensor

mic

spk

ccd

radio (cellular, PCS, satellite, local via phone line connection, local between devices) telephone means

video, audio, data, control signal transmitter (for transmitting signals at frequency that does not interfer with reception)

remote computer control signal generating means - signals are carried by the v/a transmission frequency

video, audio, data, control signal internal receiver (for receiving signals at frequency that does not interfer with transmission)

device control signal generating means -ir signals (universal remote control) for controlling devices, transmitting data to ir-enabled devices such as printers, computers, other wireless terminals, ect.

directional antenna (for transmitting signals in a direction that limits interference with internal receiver)

directional antenna (for receiving signals from external source while limiting reception of signals from internal transmitter)

user input device - one or more of a voice recognition module (on board and/or via remote computer), manually activated switches, touch screen, touch pad, trackball, ect.)

microprocessor

flat panel display driver

flat panel display

address signal generator

address signal detector

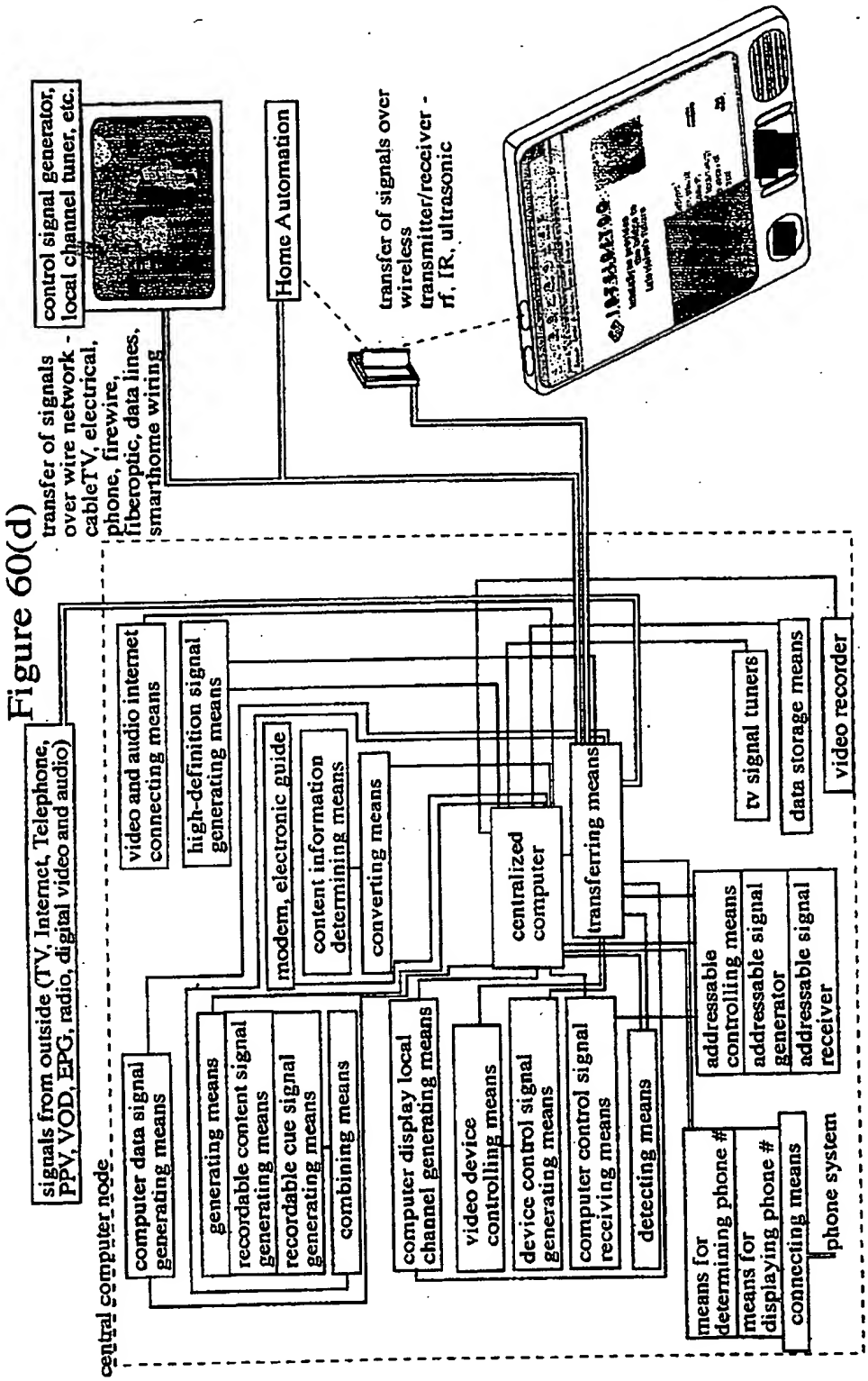
signal compressor

signal decompressor

signal scrambler

signal descrambler

Figure 60(d)


signals from outside (TV, Internet, Telephone, PPV, VOD, EPG, radio, digital video and audio)
central computer node
computer data signal generating means
generating means
recordable content signal generating means
recordable cue signal generating means
combining means
video and audio internet connecting means
high-definition signal generating means
modem, electronic guide
content information determining means
converting means
computer display local channel generating means
video device controlling means
device control signal generating means
computer control signal receiving means
detecting means
centralized computer
transferring means
addressable controlling means
addressable signal generator
addressable signal receiver
tv signal tuners
data storage means
video recorder
means for determining phone #
means for displaying phone #
connecting means
phone system
transfer of signals over wire network - cableTV, electrical, phone, firewire, fiberoptic, data lines, smarthome wiring
control signal generator, local channel tuner, etc.
Home Automation
transfer of signals over wireless transmitter/receiver - rf, IR, ultrasonic

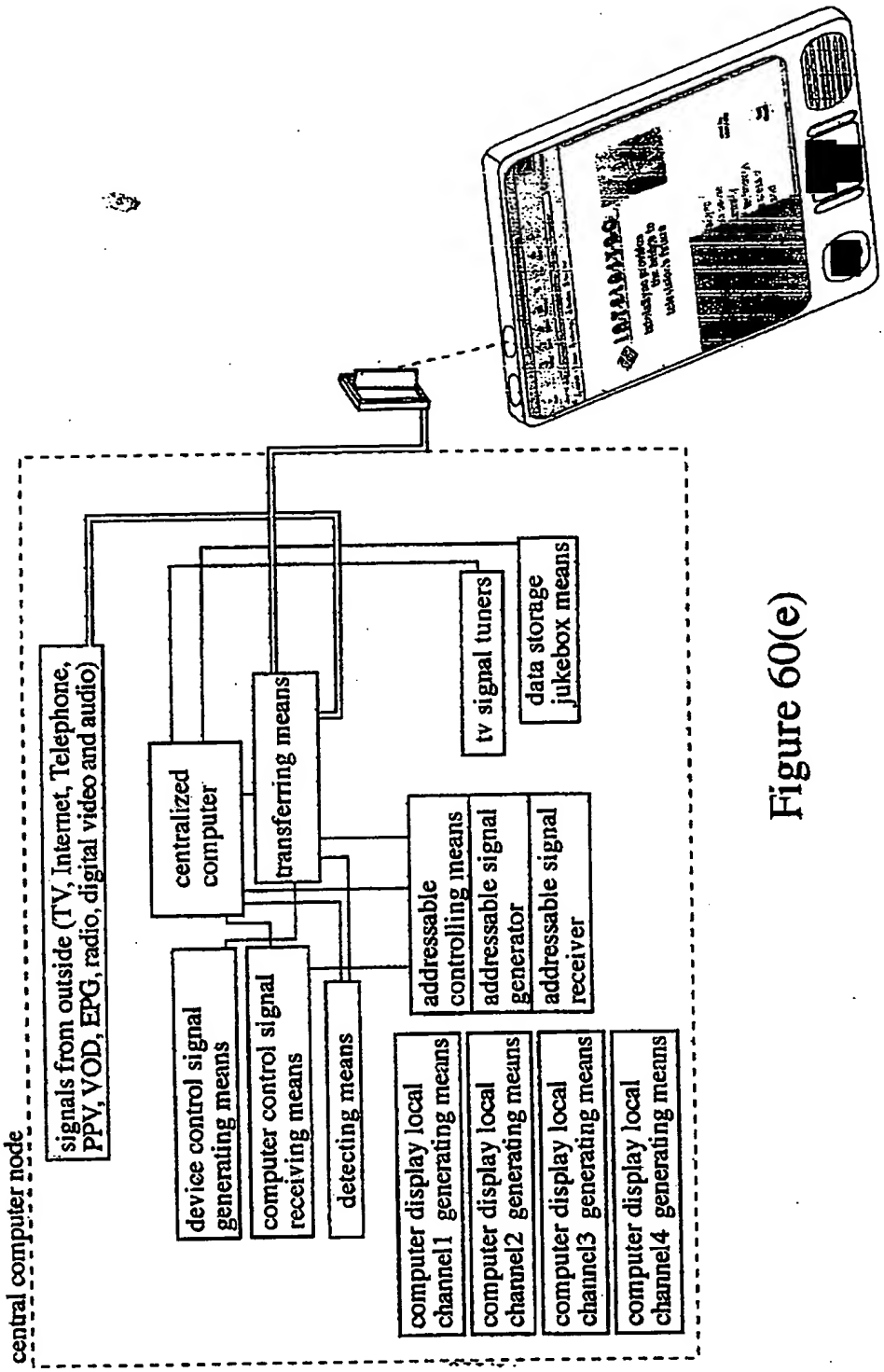
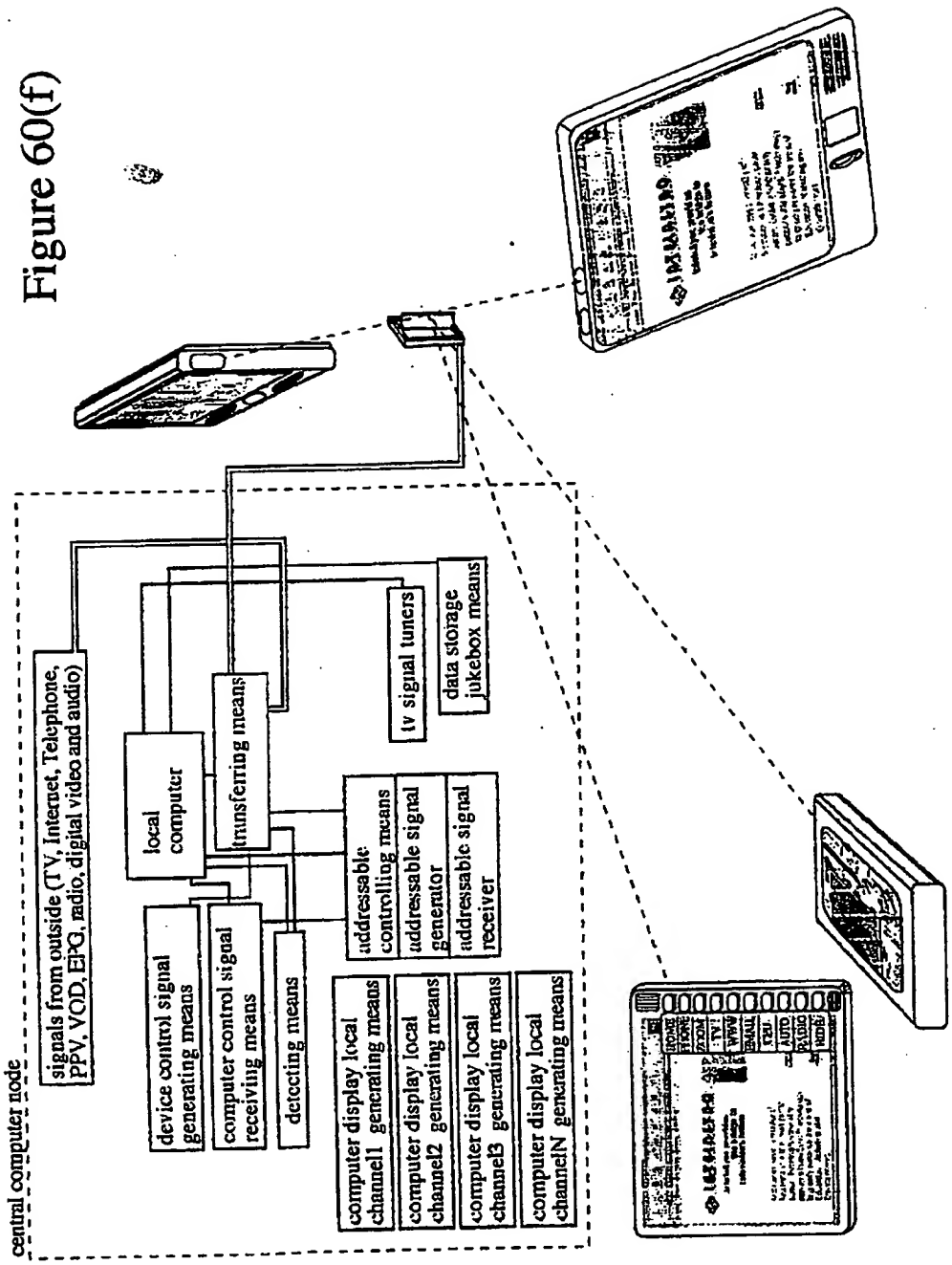

central computer node
signals from outside (TV, Internet, Telephone, PPV, VOD, EPG, radio, digital video and audio)
centralized computer
transferring means
device control signal generating means
computer control signal receiving means
detecting means
tv signal tuners
data storage jukebox means
addressable controlling means
addressable signal generator
addressable signal receiver
computer display local channel1 generating means
computer display local channel2 generating means
computer display local channel3 generating means
computer display local channel4 generating means

Figure 60(e)

Figure 60(f)


central computer node
signals from outside (TV, Internet, Telephone, PPV, VOD, EPG, radio, digital video and audio)
local computer
transferring means
tv signal tuners
data storage jukebox means
device control signal generating means
computer control signal receiving means
detecting means
addressable controlling means
addressable signal generator
addressable signal receiver
computer display local channel1 generating means
computer display local channel2 generating means
computer display local channel3 generating means
computer display local channelN generating means

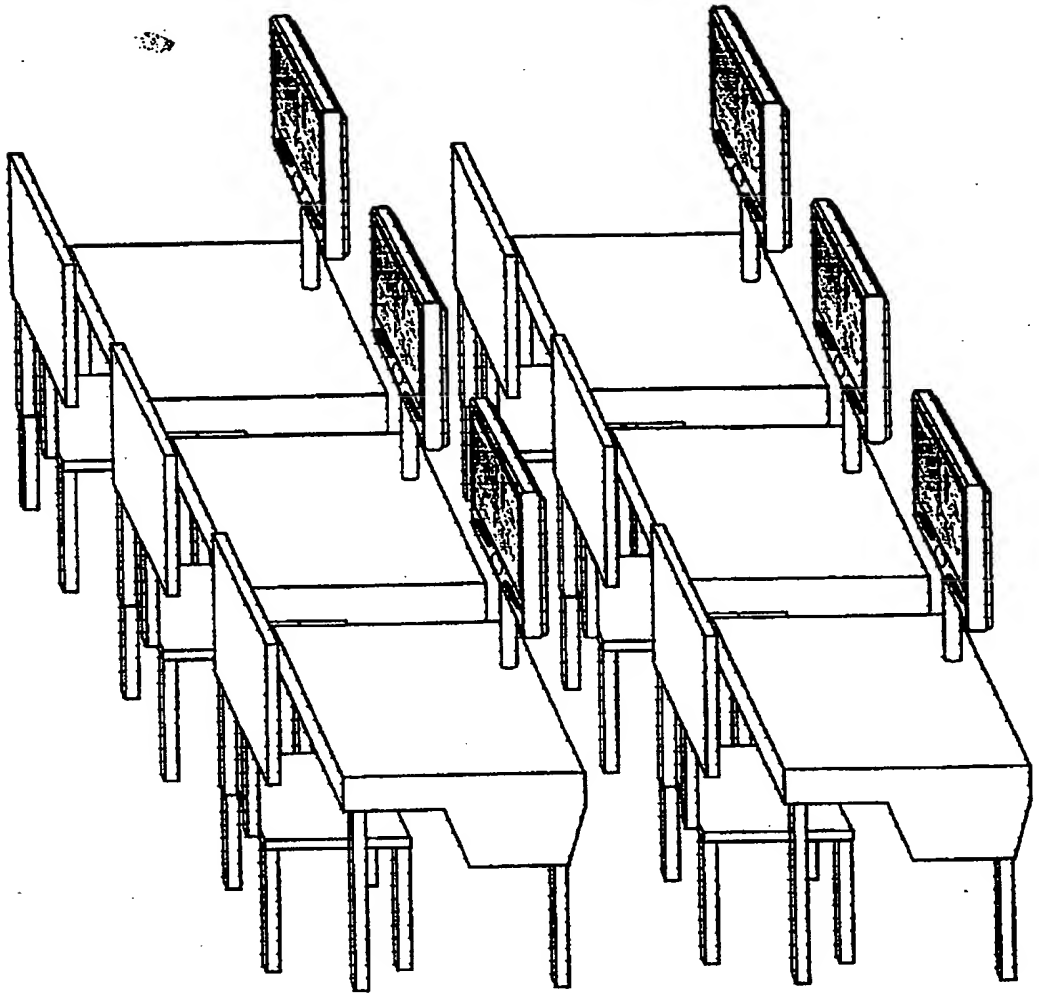


Figure 60(g)

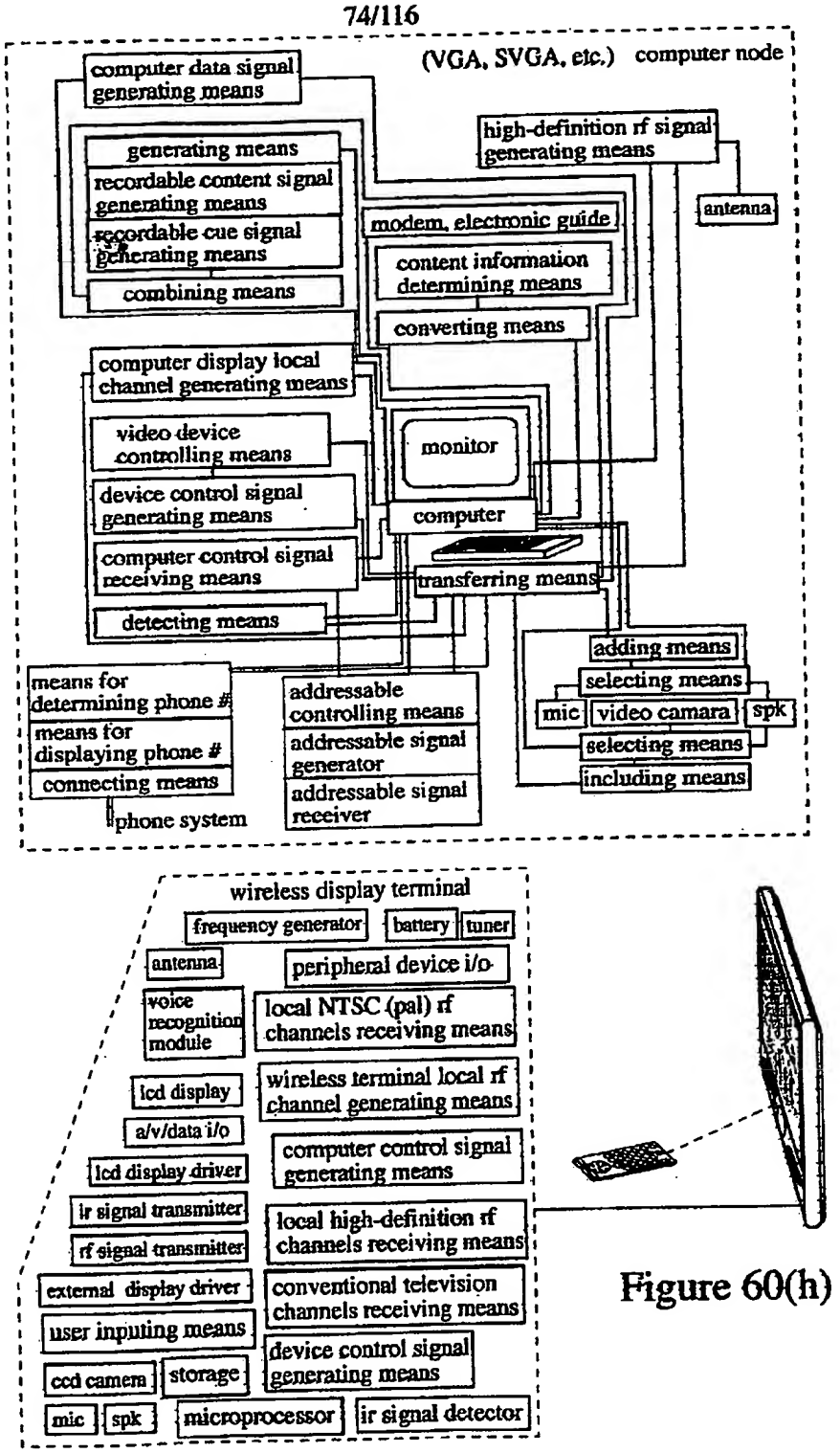

(VGA, SVGA, etc.) computer node
computer data signal generating means
generating means
recordable content signal generating means
recordable cue signal generating means
combining means
high-definition rf signal generating means
antenna
modem, electronic guide
content information determining means
converting means
computer display local channel generating means
video device controlling means
device control signal generating means
computer control signal receiving means
detecting means
monitor
computer
transferring means
adding means
selecting means
mic
video camara
spk
selecting means
including means
means for determining phone #
means for displaying phone #
connecting means
phone system
addressable controlling means
addressable signal generator
addressable signal receiver
wireless display terminal
frequency generator
battery
tuner
antenna
peripheral device i/o
voice recognition module
local NTSC (pal) rf channels receiving means
lcd display
wireless terminal local rf channel generating means
a/v/data i/o
computer control signal generating means
lcd display driver
ir signal transmitter
rf signal transmitter
local high-definition rf channels receiving means
external display driver
conventional television channels receiving means
user inputing means
device control signal generating means
ccd camera
storage
mic
spk
microprocessor
ir signal detector

Figure 60(h)

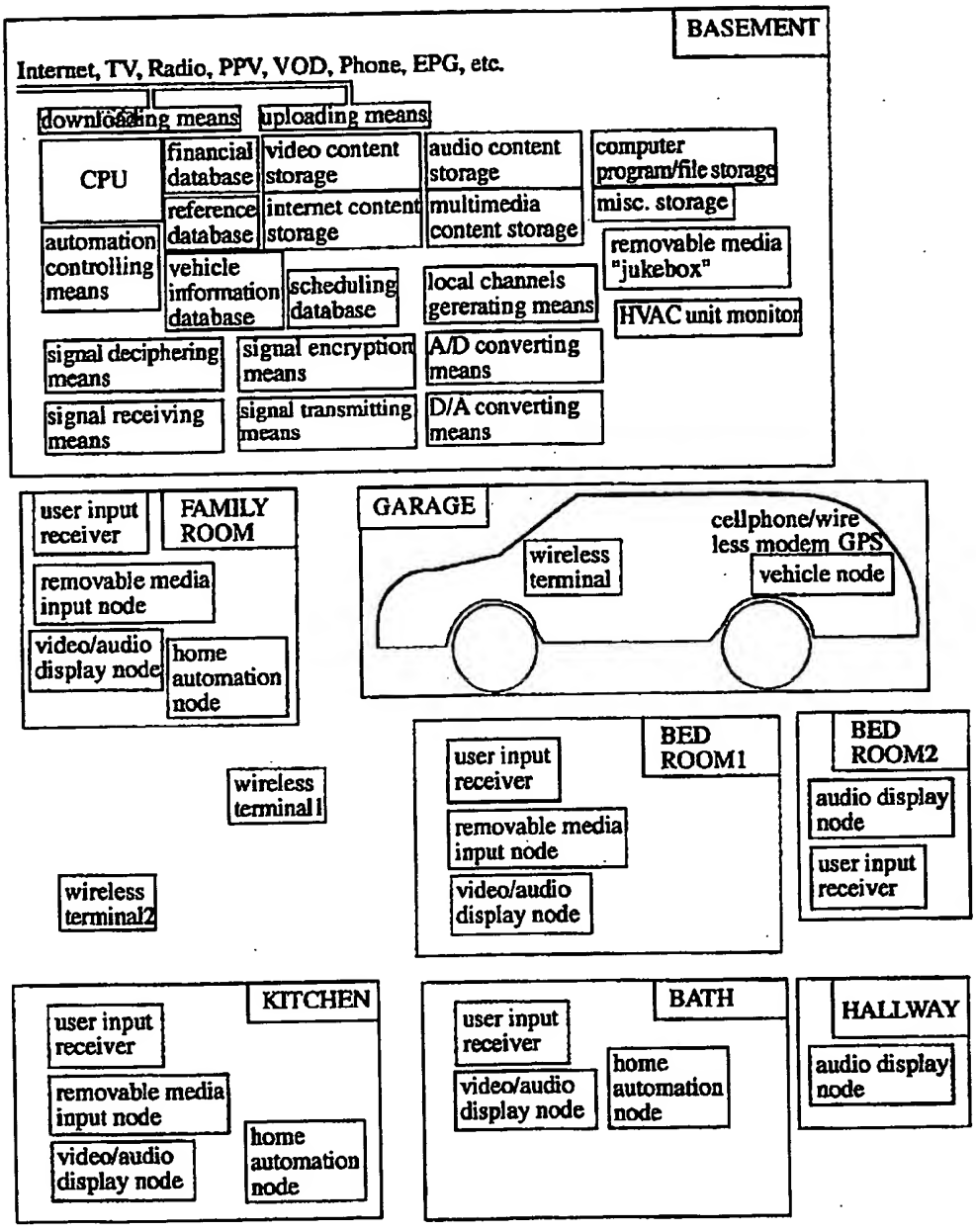

BASEMENT
Internet, TV, Radio, PPV, VOD, Phone, EPG, etc.
downloading means
uploading means
CPU
financial database
video content storage
audio content storage
computer program/file storage
reference database
internet content storage
multimedia content storage
misc. storage
automation controlling means
vehicle information database
scheduling database
local channels gererating means
removable media "jukebox"
HVAC unit monitor
signal deciphering means
signal encryption means
A/D converting means
signal receiving means
signal transmitting means
D/A converting means
user input receiver
FAMILY ROOM
removable media input node
video/audio display node
home automation node
GARAGE
wireless terminal
cellphone/wireless modem GPS
vehicle node
wireless terminal1
wireless terminal2
BED ROOM1
user input receiver
removable media input node
video/audio display node
BED ROOM2
audio display node
user input receiver
KITCHEN
user input receiver
removable media input node
video/audio display node
home automation node
BATH
user input receiver
video/audio display node
home automation node
HALLWAY
audio display node

Figure 60(i)

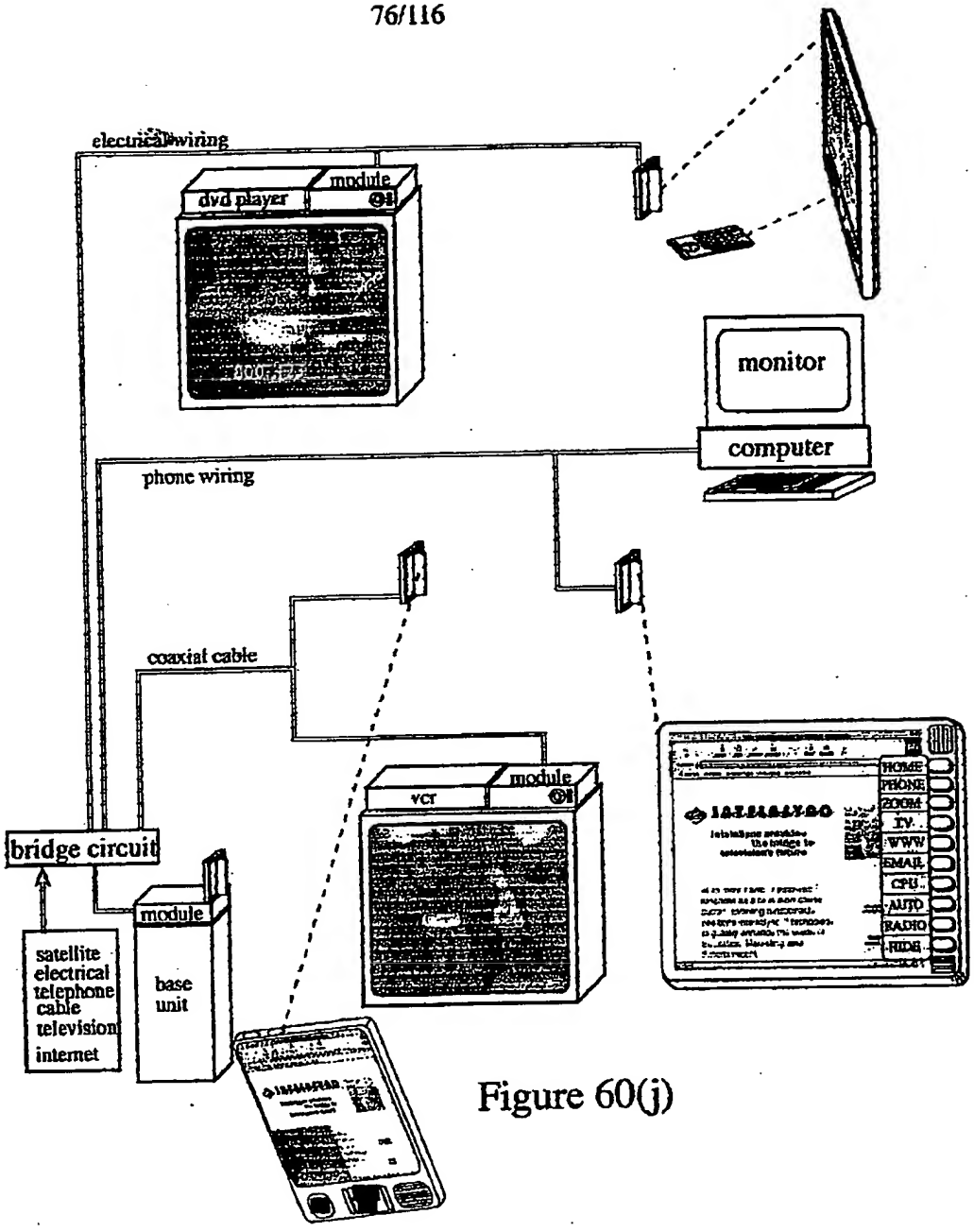

electrical wiring
dvd player
module
monitor
computer
phone wiring
coaxial cable
bridge circuit
module
satellite
electrical
telephone
cable
television
internet
base
unit
VCT
module
HOME
PHONE
ZOOM
TV
WWW
EMAIL
CPU
AUTO
RADIO
RIDE

Figure 60(j)

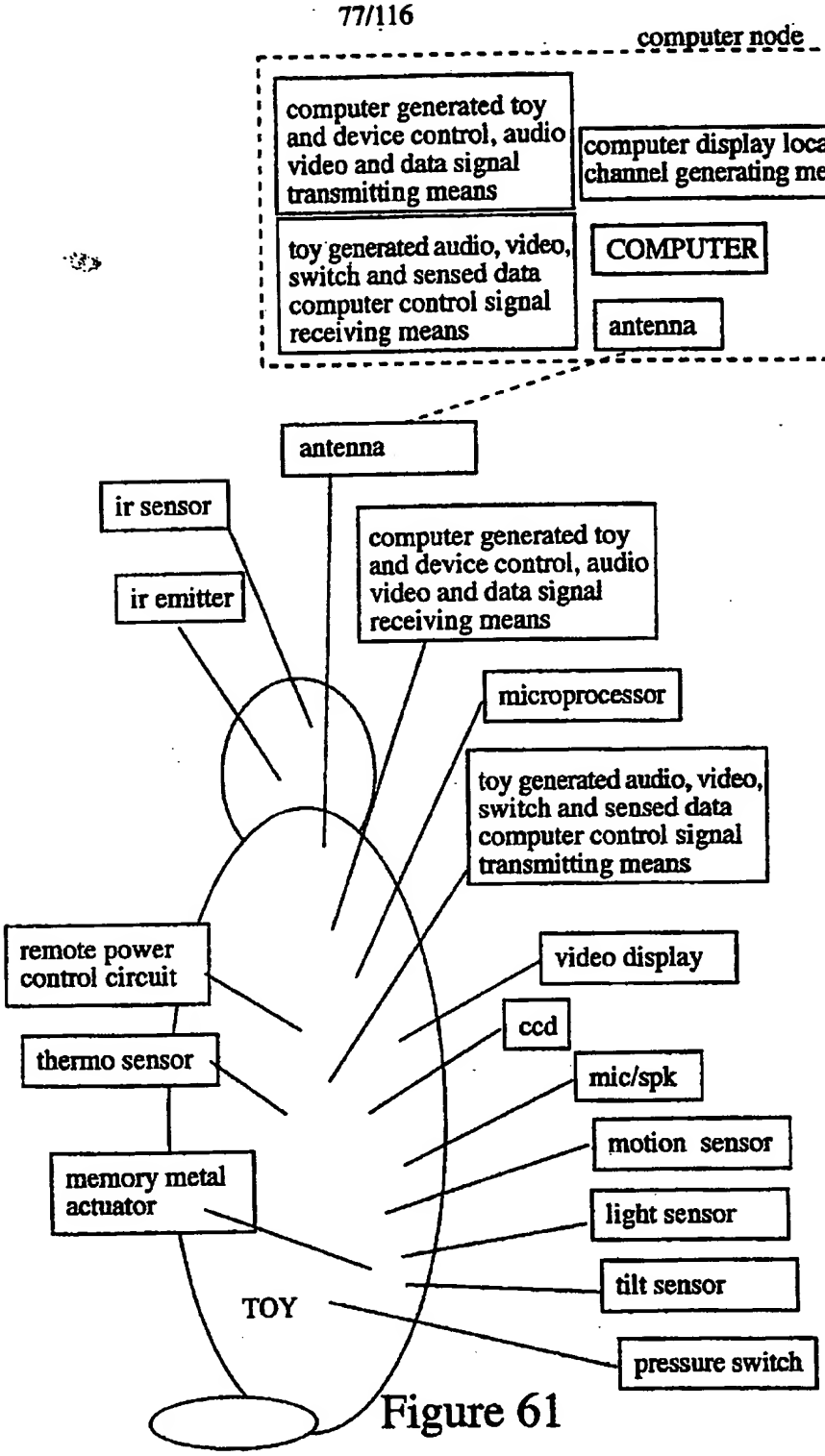

computer node
computer generated toy and device control, audio video and data signal transmitting means
computer display local channel generating means
toy generated audio, video, switch and sensed data computer control signal receiving means
COMPUTER
antenna
antenna
ir sensor
ir emitter
computer generated toy and device control, audio video and data signal receiving means
microprocessor
toy generated audio, video, switch and sensed data computer control signal transmitting means
remote power control circuit
video display
ccd
thermo sensor
mic/spk
motion sensor
memory metal actuator
light sensor
tilt sensor
TOY
pressure switch

Figure 61

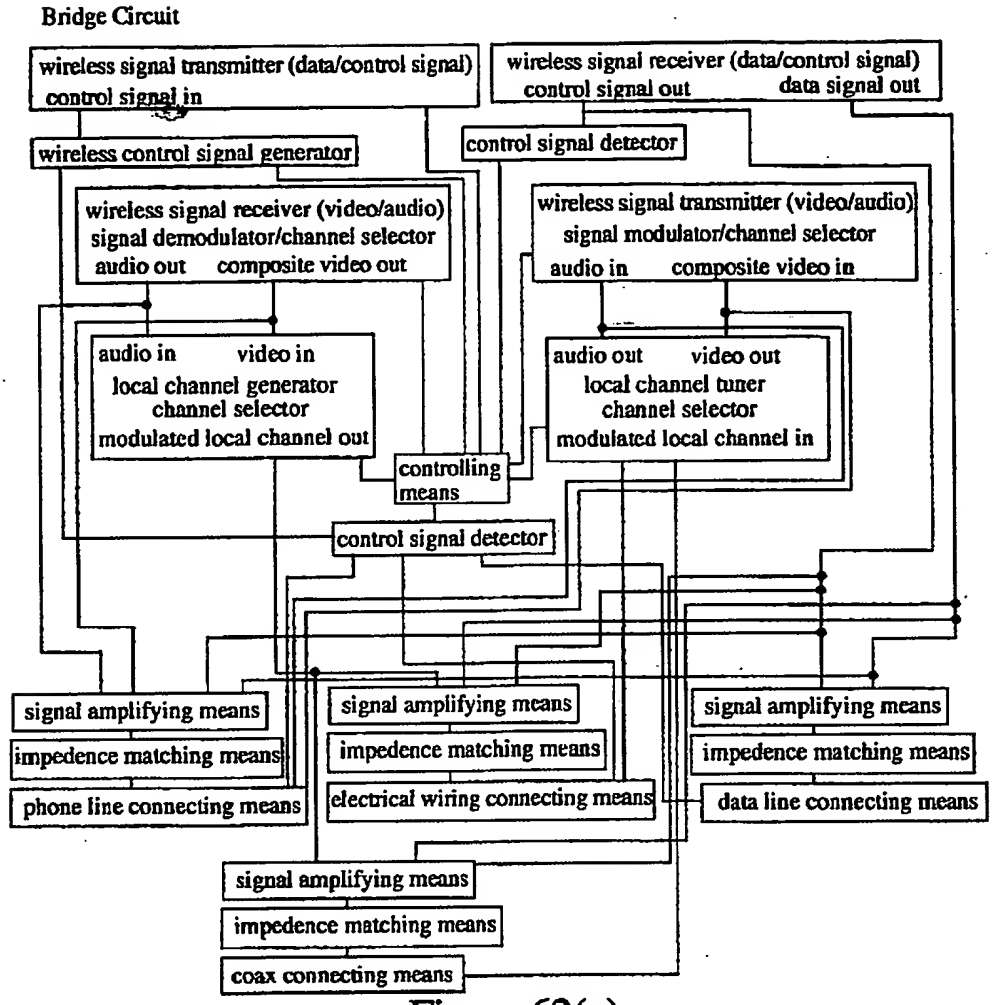

Bridge Circuit
wireless signal transmitter (data/control signal)
control signal in
wireless signal receiver (data/control signal)
control signal out
data signal out
wireless control signal generator
control signal detector
wireless signal receiver (video/audio)
signal demodulator/channel selector
audio out
composite video out
wireless signal transmitter (video/audio)
signal modulator/channel selector
audio in
composite video in
audio in
video in
local channel generator
channel selector
modulated local channel out
audio out
video out
local channel tuner
channel selector
modulated local channel in
controlling means
control signal detector
signal amplifying means
impedence matching means
phone line connecting means
signal amplifying means
impedence matching means
electrical wiring connecting means
signal amplifying means
impedence matching means
data line connecting means
signal amplifying means
impedence matching means
coax connecting means

Figure 62(a)

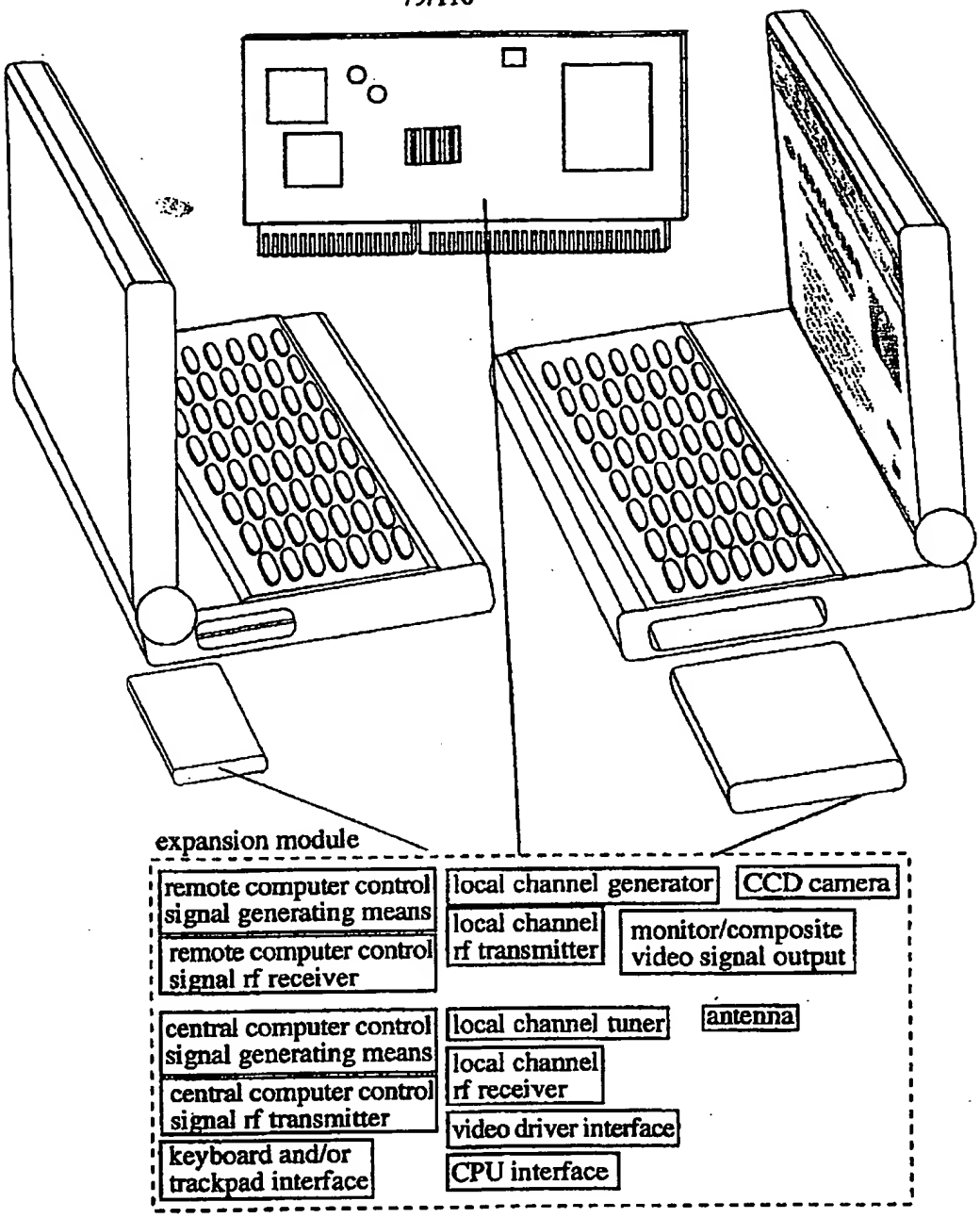

expansion module
remote computer control signal generating means
remote computer control signal rf receiver
central computer control signal generating means
central computer control signal rf transmitter
keyboard and/or trackpad interface
local channel generator
CCD camera
local channel rf transmitter
monitor/composite video signal output
local channel tuner
antenna
local channel rf receiver
video driver interface
CPU interface

Figure 62(b)

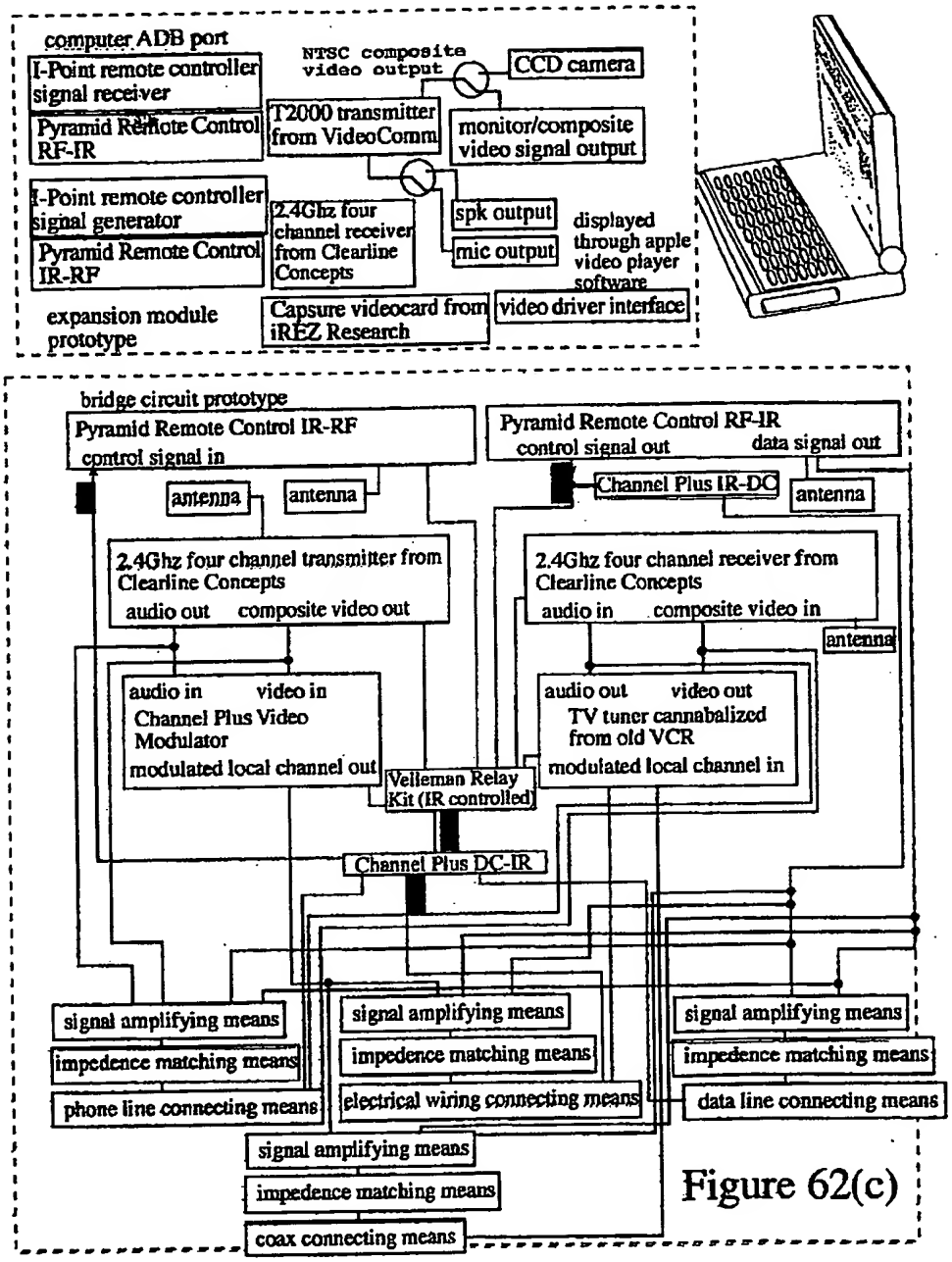

computer ADB port
I-Point remote controller signal receiver
Pyramid Remote Control RF-IR
I-Point remote controller signal generator
Pyramid Remote Control IR-RF
expansion module prototype
NTSC composite video output
CCD camera
T2000 transmitter from VideoComm
monitor/composite video signal output
2.4Ghz four channel receiver from Clearline Concepts
spk output
mic output
displayed through apple video player software
Capsure videocard from iREZ Research
video driver interface
bridge circuit prototype
Pyramid Remote Control IR-RF
control signal in
Pyramid Remote Control RF-IR
control signal out
data signal out
antenna
antenna
Channel Plus IR-DC
antenna
2.4Ghz four channel transmitter from Clearline Concepts
audio out
composite video out
2.4Ghz four channel receiver from Clearline Concepts
audio in
composite video in
antenna
audio in
video in
Channel Plus Video Modulator
modulated local channel out
audio out
video out
TV tuner cannabalized from old VCR
modulated local channel in
Velleman Relay Kit (IR controlled)
Channel Plus DC-IR
signal amplifying means
impedence matching means
phone line connecting means
signal amplifying means
impedence matching means
electrical wiring connecting means
signal amplifying means
impedence matching means
data line connecting means
signal amplifying means
impedence matching means
coax connecting means

Figure 62(c)

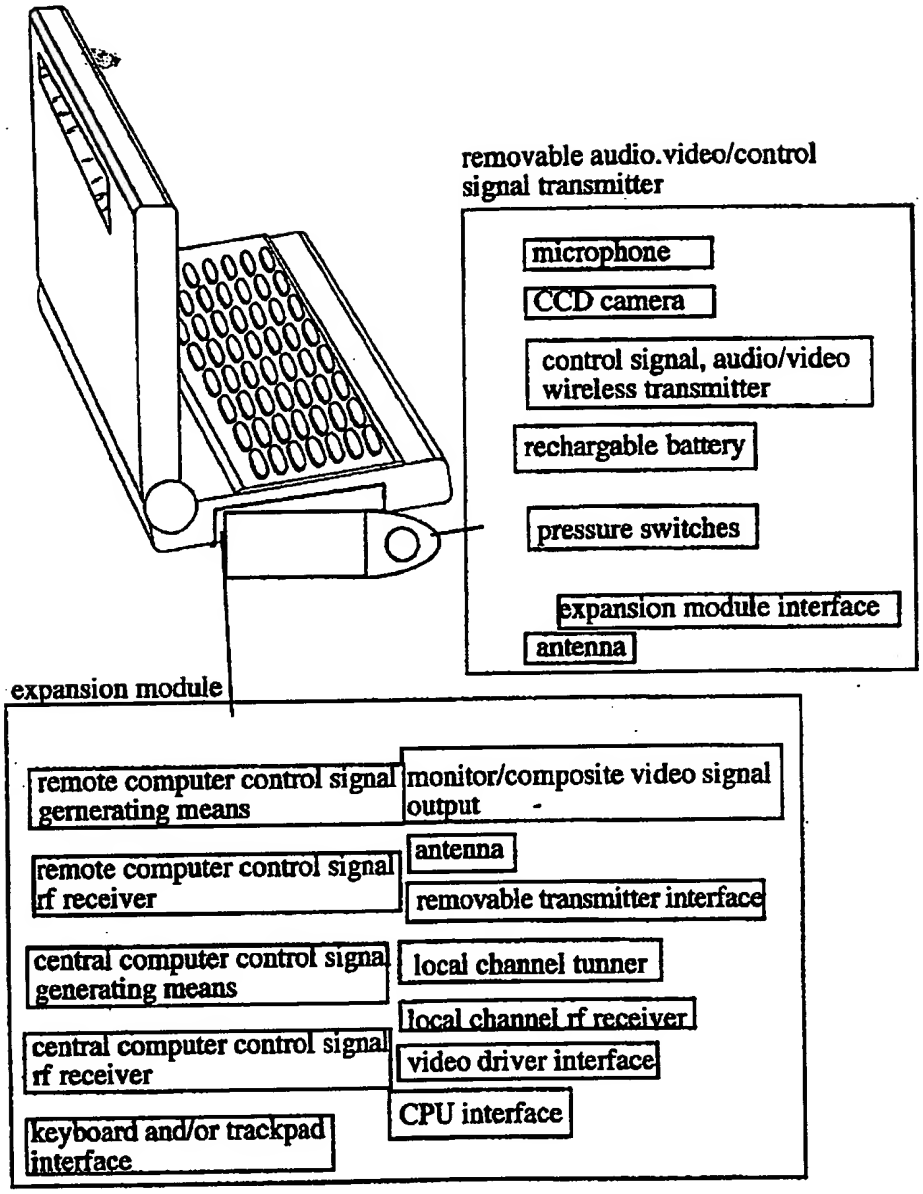

removable audio.video/control signal transmitter
microphone
CCD camera
control signal, audio/video wireless transmitter
rechargable battery
pressure switches
expansion module interface
antenna
expansion module
remote computer control signal gernerating means
monitor/composite video signal output
antenna
remote computer control signal rf receiver
removable transmitter interface
central computer control signal generating means
local channel tunner
local channel rf receiver
central computer control signal rf receiver
video driver interface
CPU interface
keyboard and/or trackpad interface

Figure 62(d)

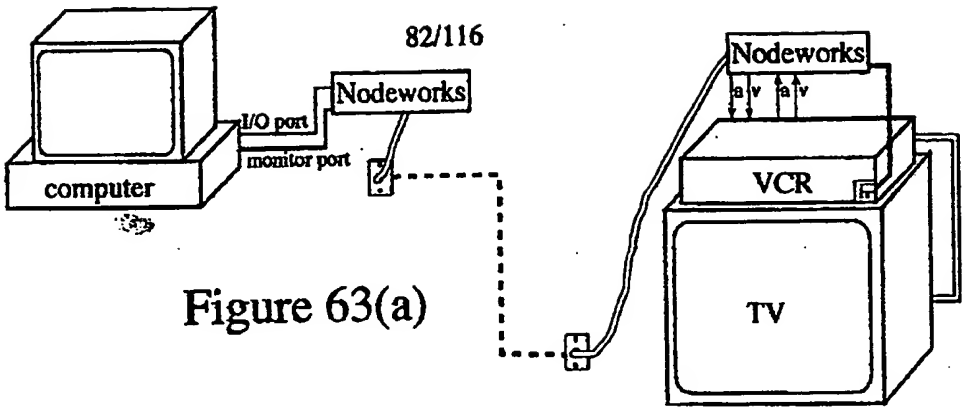


Figure 63(a)

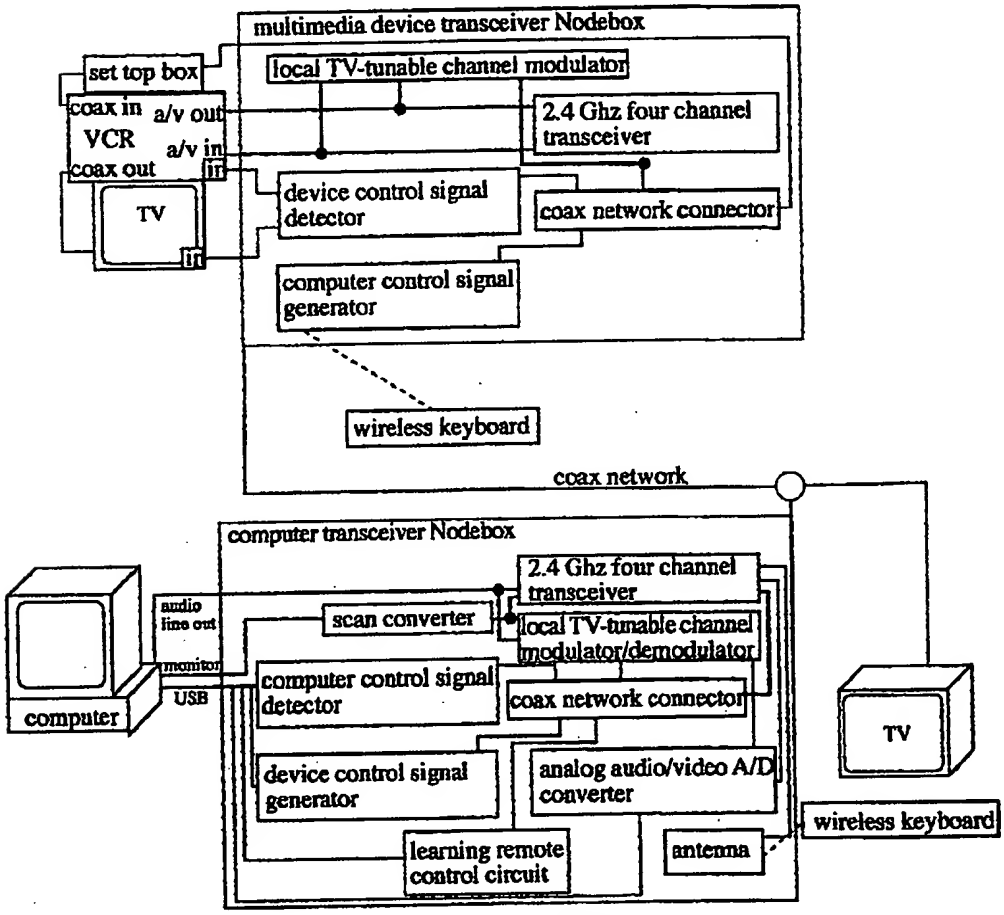


Figure 63(b)

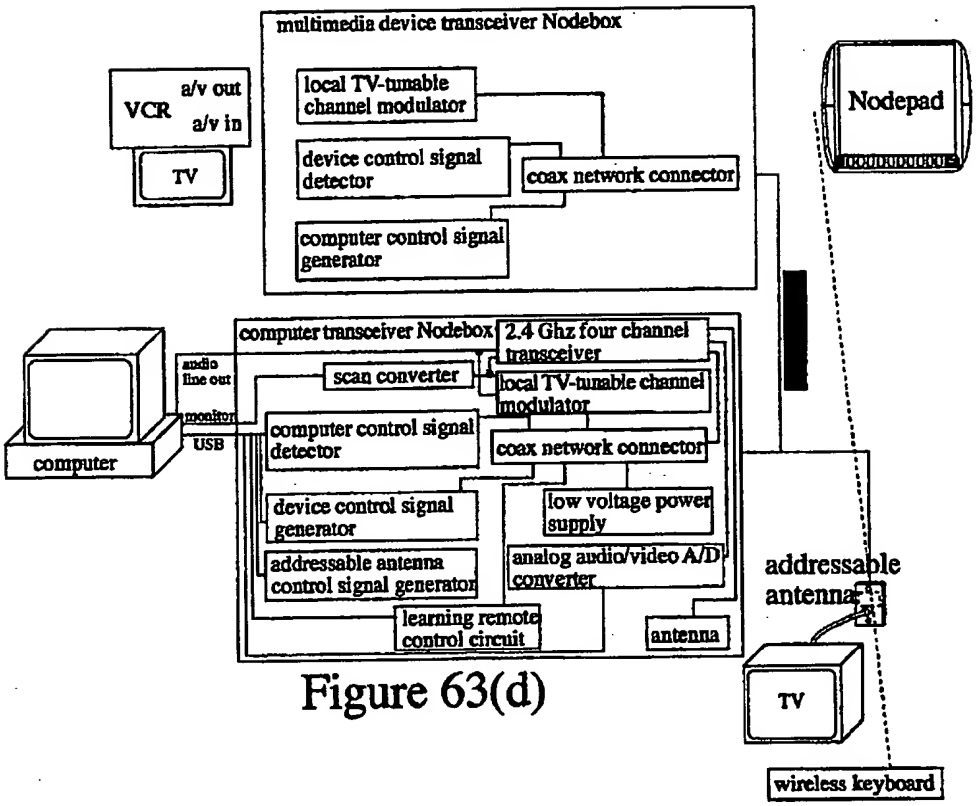

multimedia device transceiver Nodebox
VCR
a/v out
a/v in
TV
local TV-tunable channel modulator
device control signal detector
coax network connector
computer control signal generator
Nodepad
computer transceiver Nodebox
2.4 Ghz four channel transceiver
audio line out
scan converter
local TV-tunable channel modulator
monitor
USB
computer control signal detector
coax network connector
computer
device control signal generator
low voltage power supply
addressable antenna control signal generator
analog audio/video A/D converter
addressable antenna
learning remote control circuit
antenna
TV
wireless keyboard

Figure 63(d)

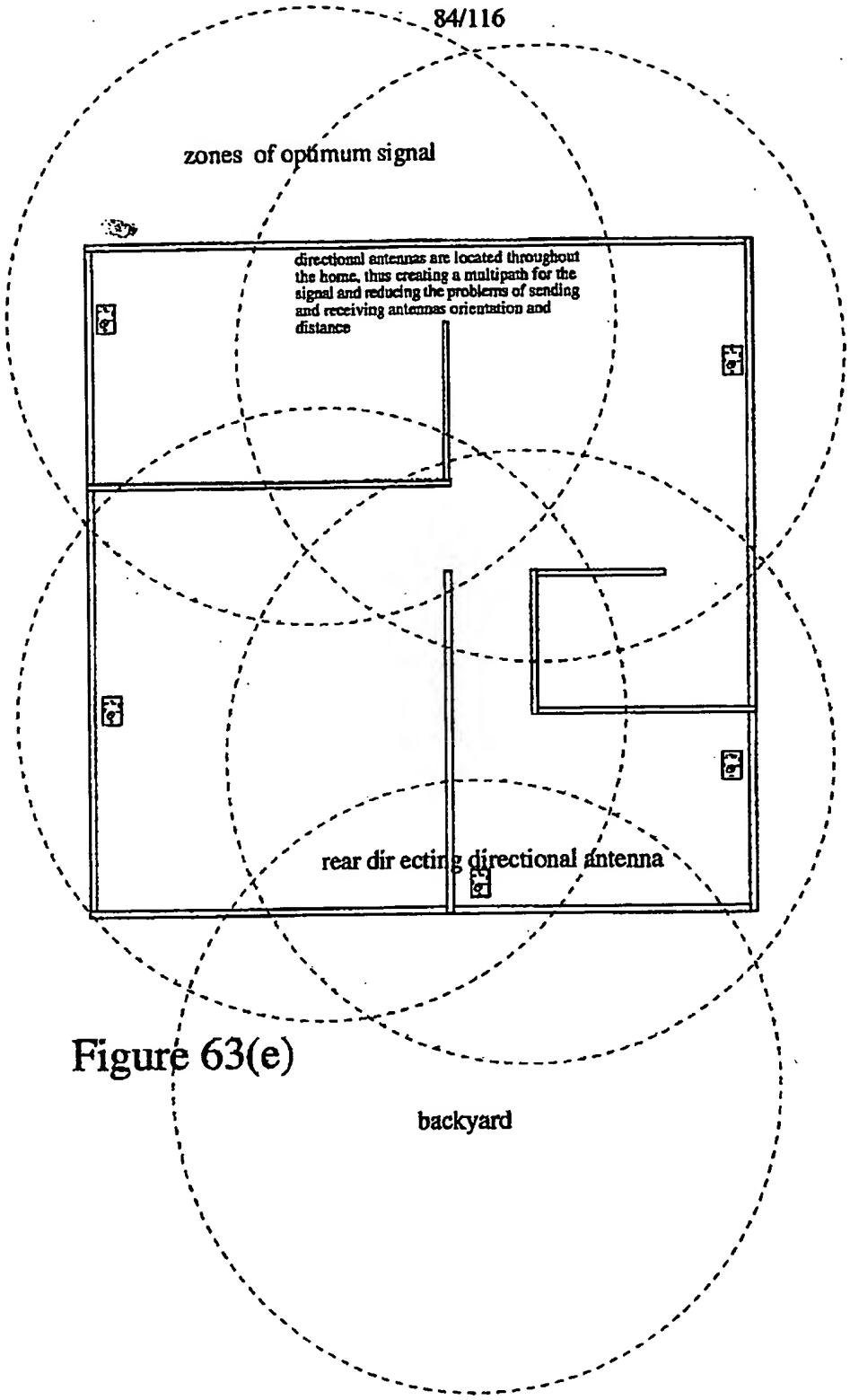

zones of optimum signal
directional antennas are located throughout the home, thus creating a multipath for the signal and reducing the problems of sending and receiving antennas orientation and distance
rear dir ecting directional antenna
backyard

Figure 63(e)

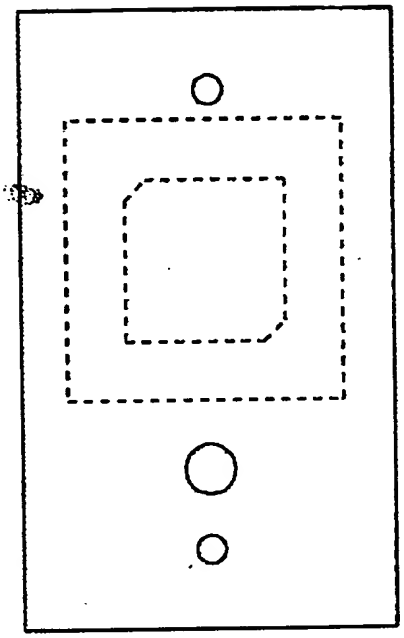


Figure 64(a)

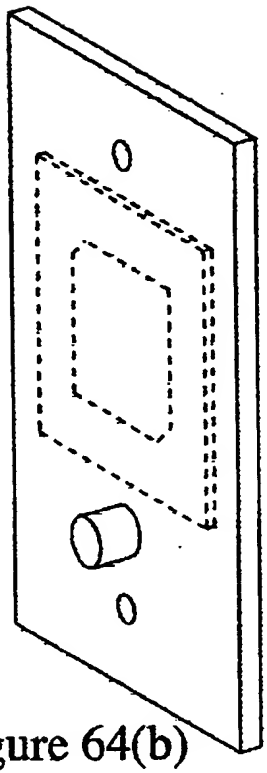


Figure 64(b)

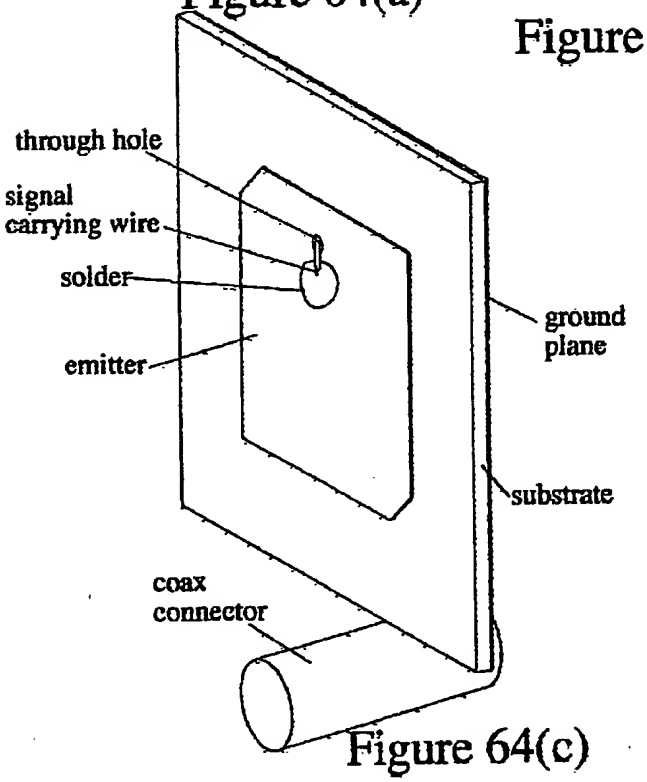


Figure 64(c)

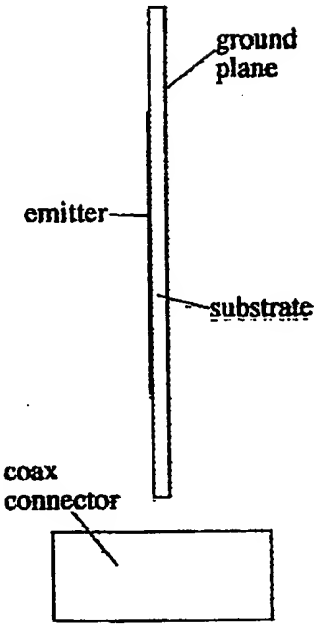


Figure 64(d)

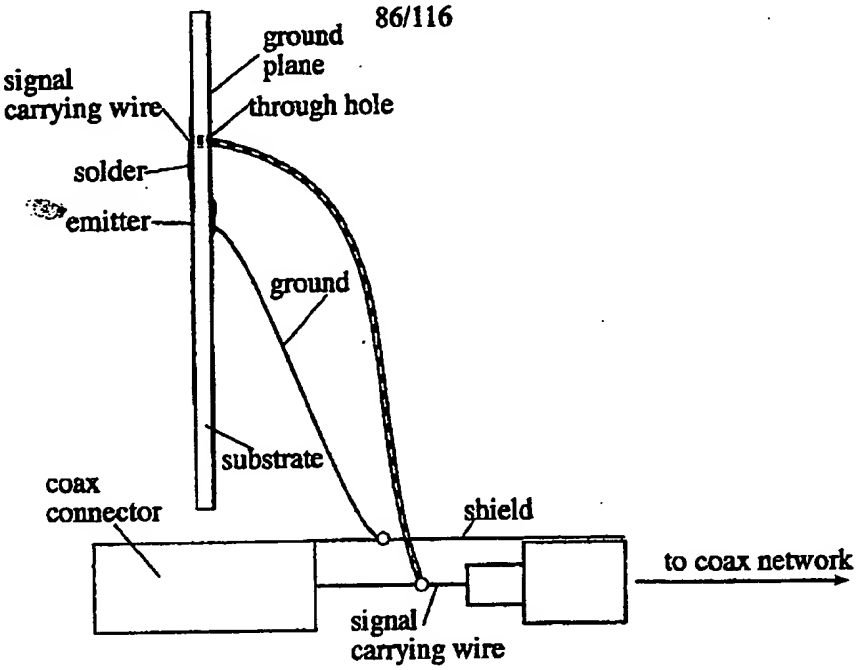
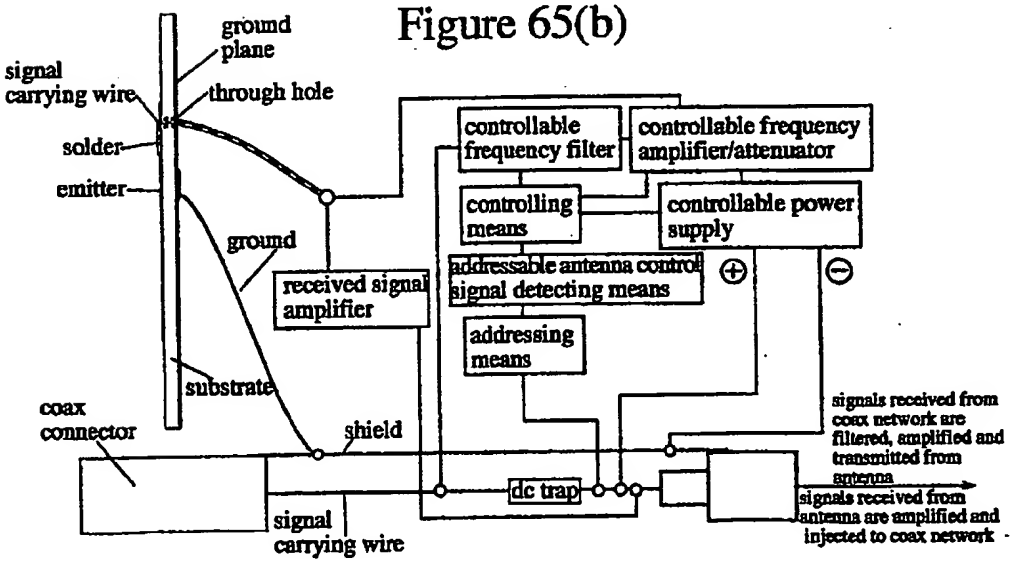


Figure 65(a)

Figure 65(b)



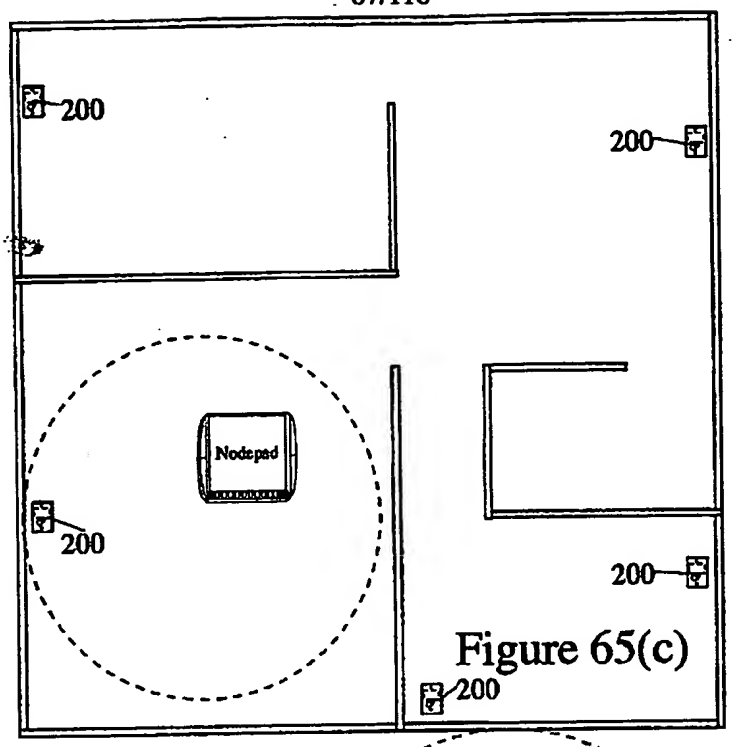


Figure 65(c)

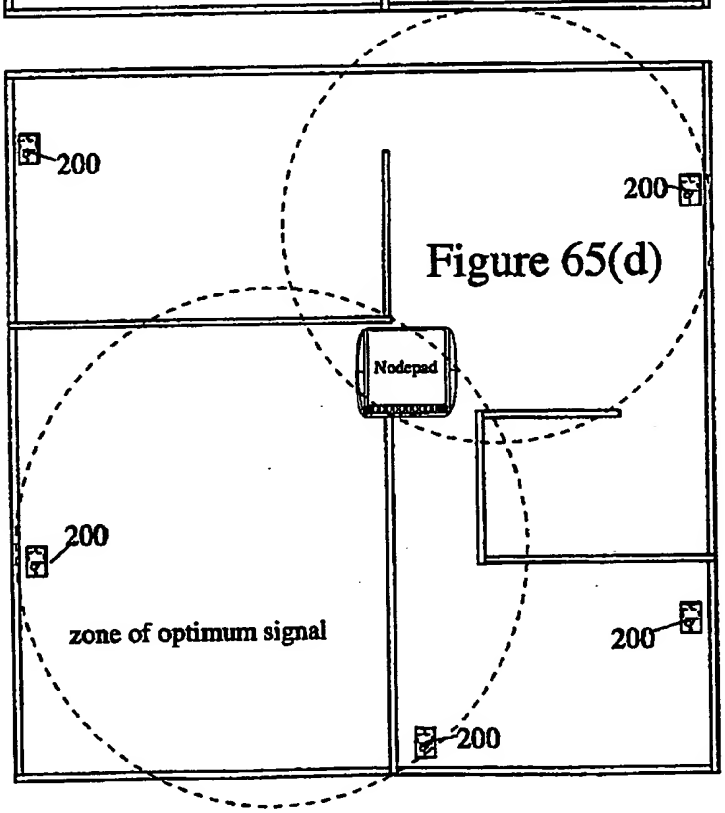


Figure 65(d)

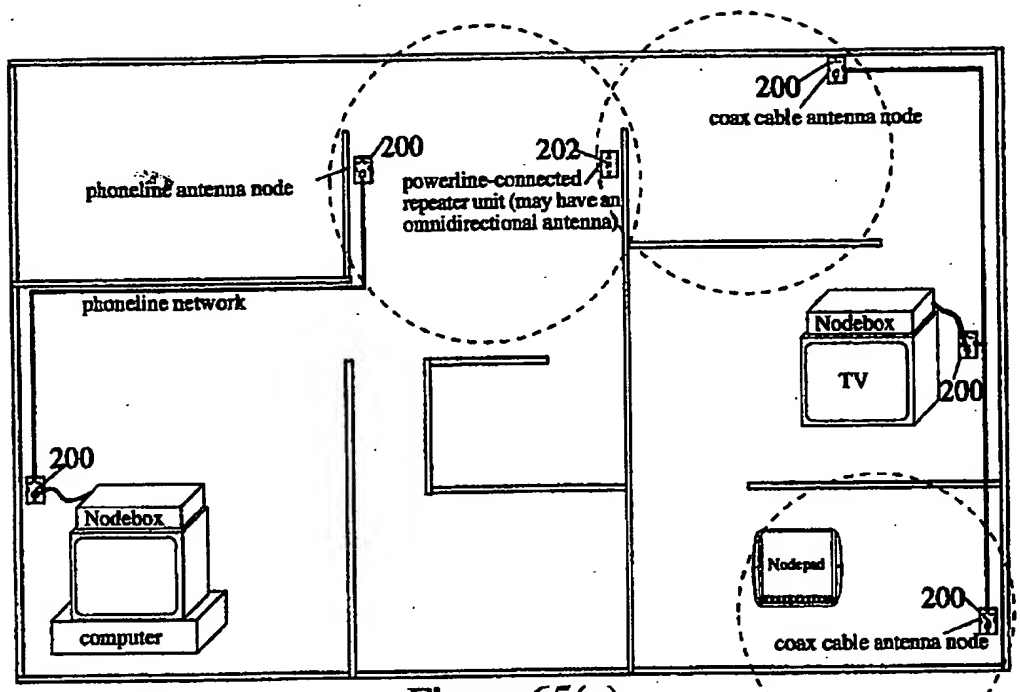


Figure 65(e)

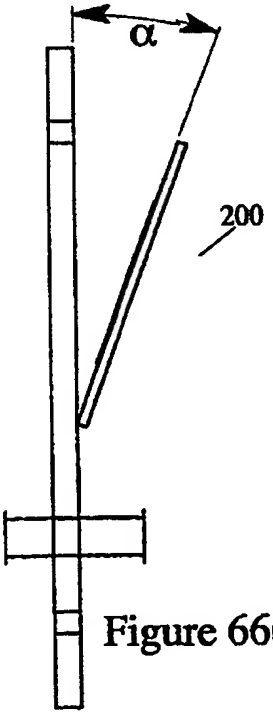


Figure 66(a)

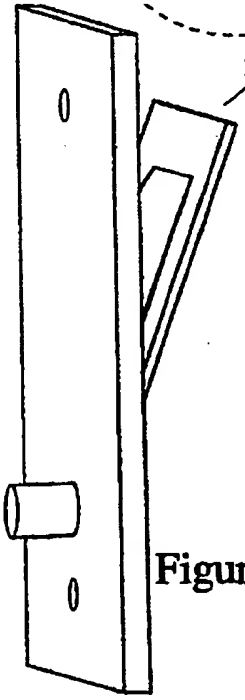


Figure 66(b)

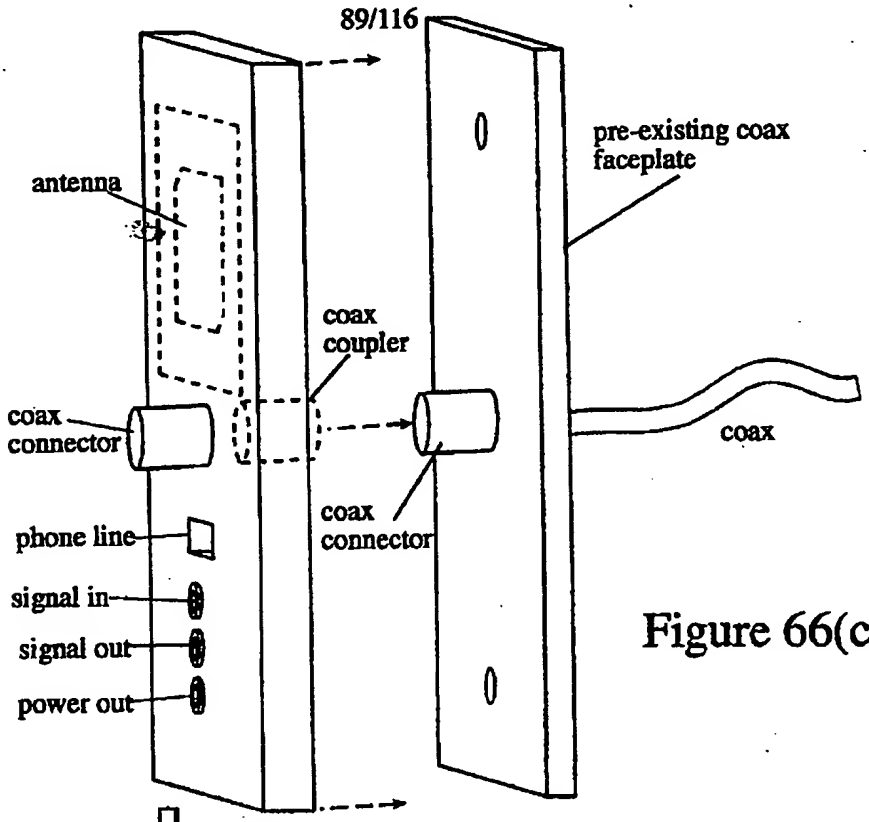


Figure 66(c)

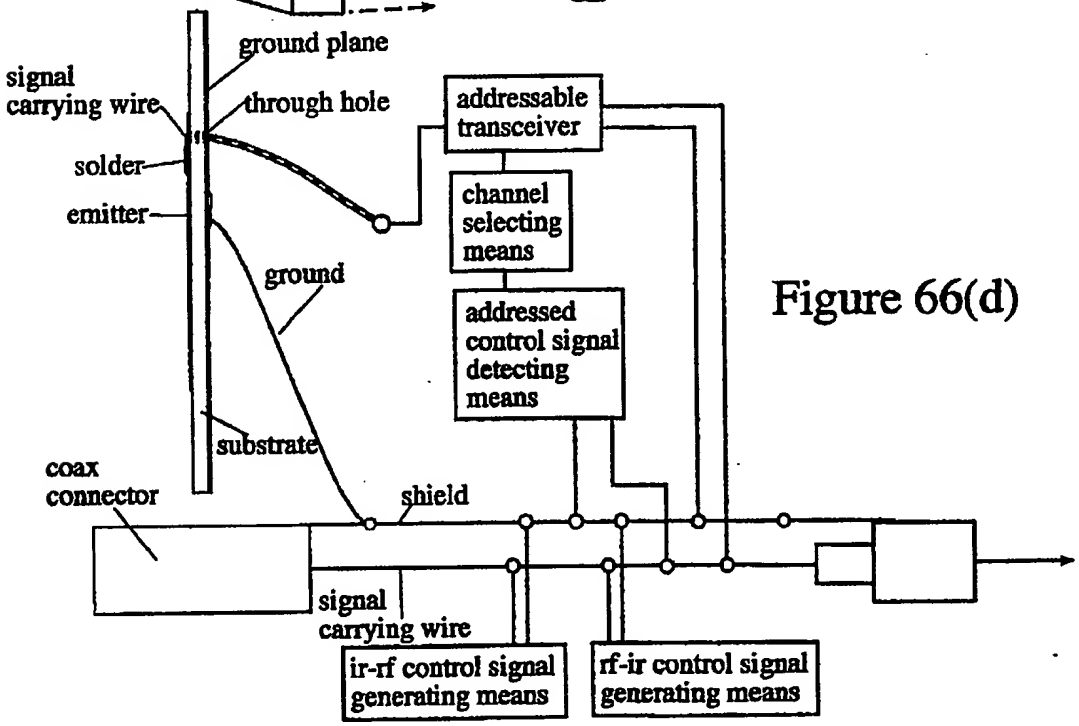


Figure 66(d)

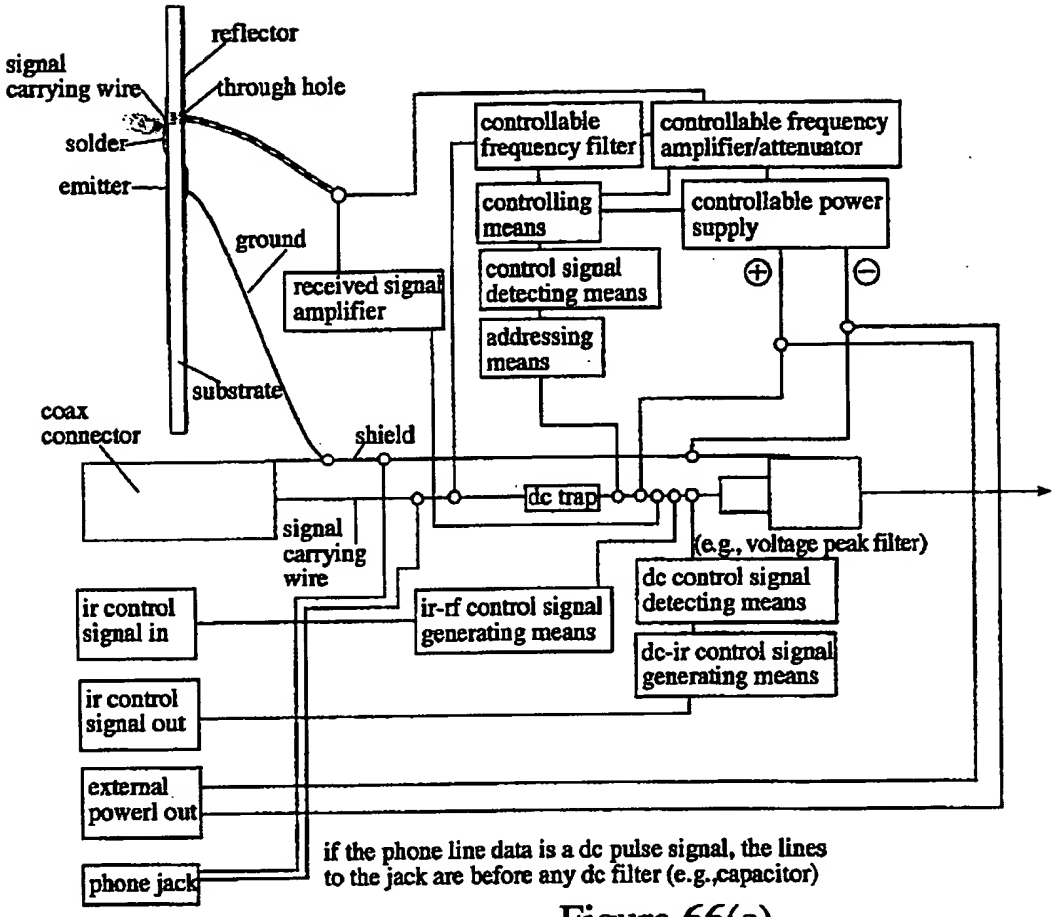


Figure 66(e)

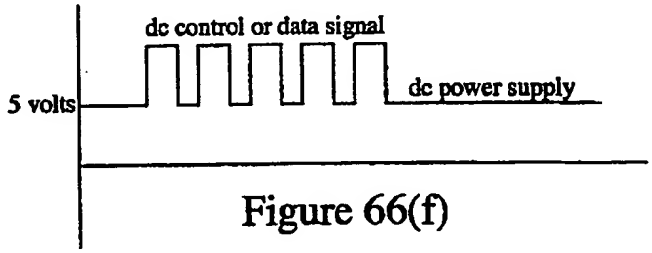


Figure 66(f)

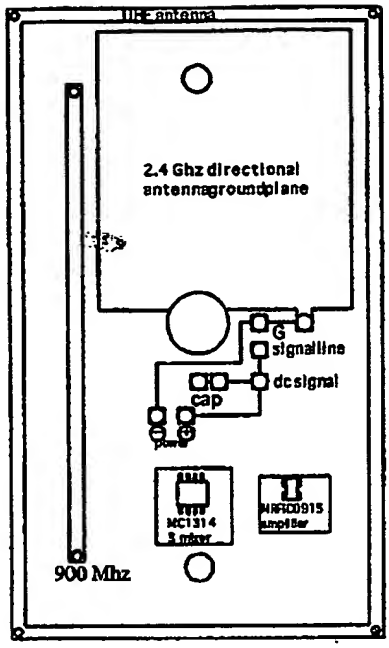


Figure 66(g)

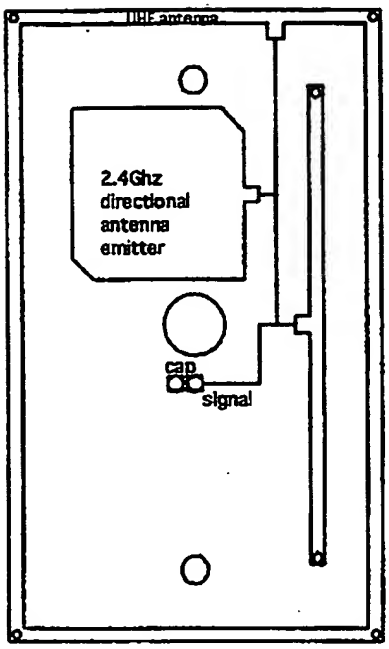


Figure 66(h)

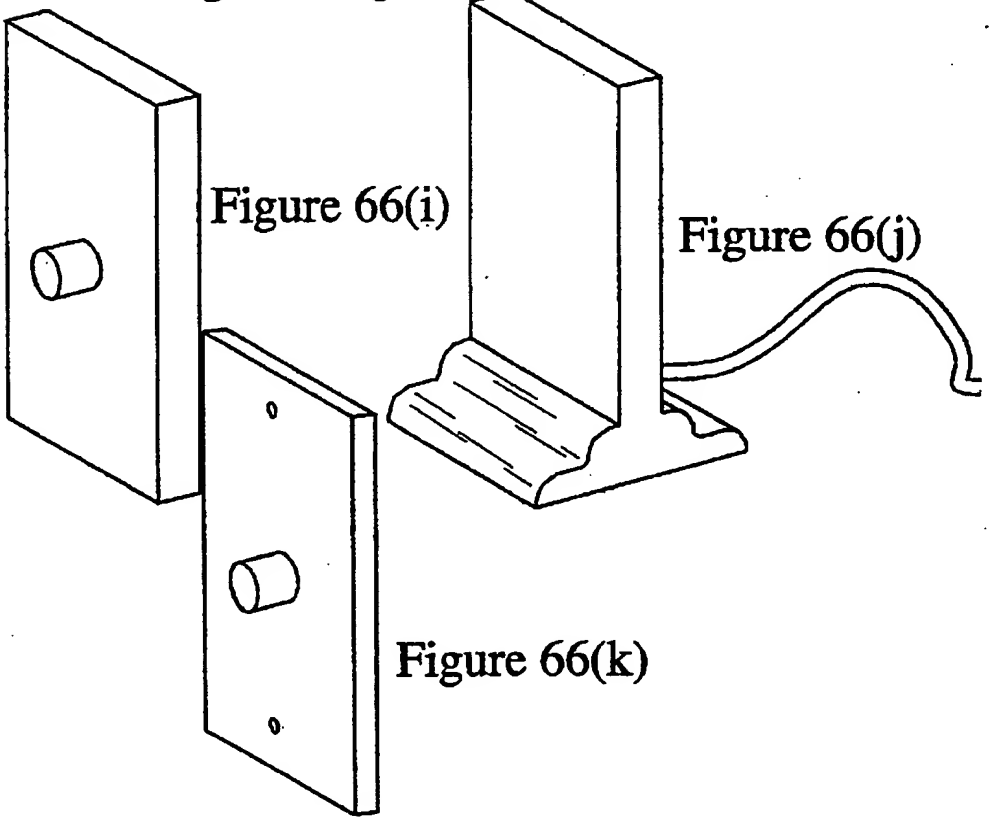


Figure 66(i)

Figure 66(j)

Figure 66(k)

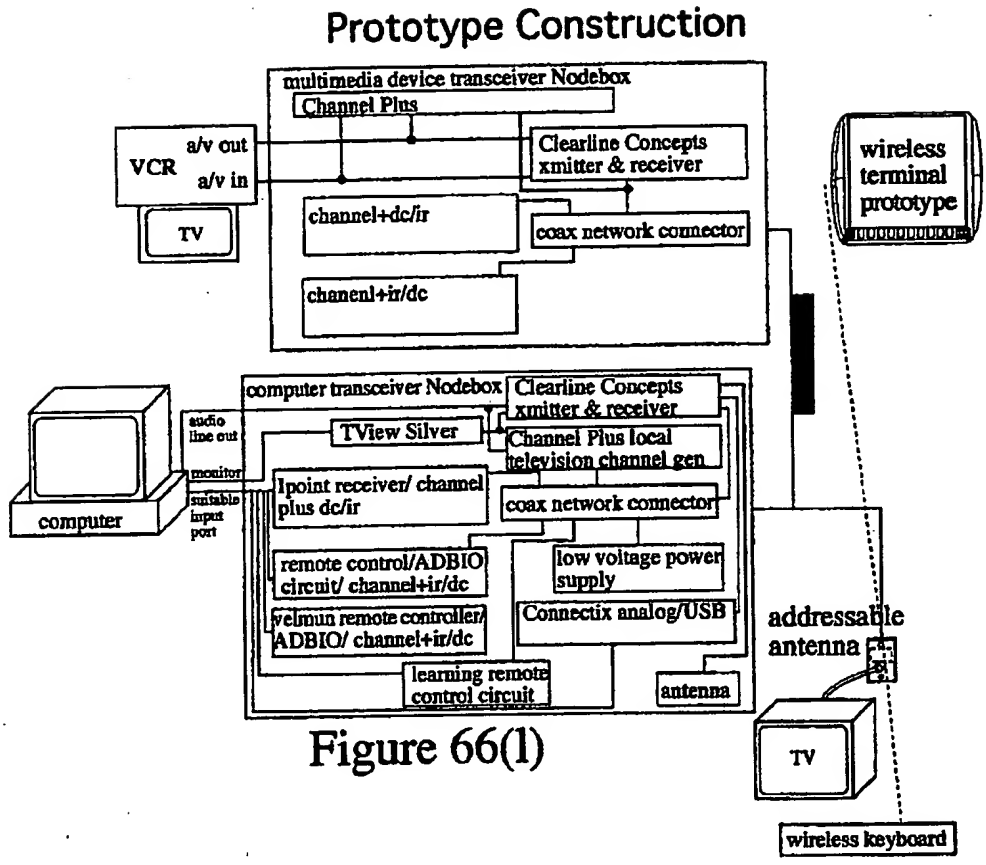

Prototype Construction
multimedia device transceiver Nodebox
Channel Plus
VCR
a/v out
a/v in
TV
Clearline Concepts xmitter & receiver
channel+dc/ir
coax network connector
chanenl+ir/dc
wireless terminal prototype
computer transceiver Nodebox
Clearline Concepts xmitter & receiver
audio line out
TView Silver
Channel Plus local television channel gen
monitor
suitable input port
computer
Ipoint receiver/ channel plus dc/ir
coax network connector
remote control/ADBIO circuit/ channel+ir/dc
low voltage power supply
velmun remote controller/ ADBIO/ channel+ir/dc
Connectix analog/USB
addressable antenna
learning remote control circuit
antenna
TV
wireless keyboard

Figure 66(1)

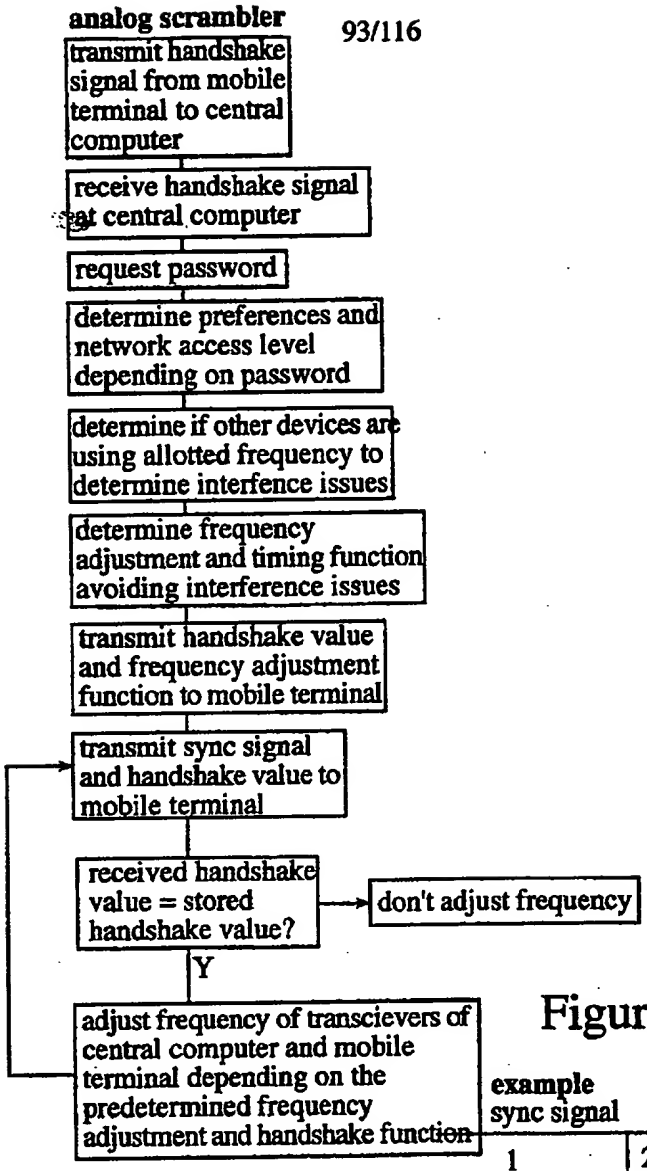


Figure 67(a)

Figure 67(b)

example sync signal	frequency f
1	2.325Ghz
2	2.475Ghz
3	2.210Ghz
4	2.505Ghz
5	2.315Ghz
6	2.400Ghz
N	2.285Ghz

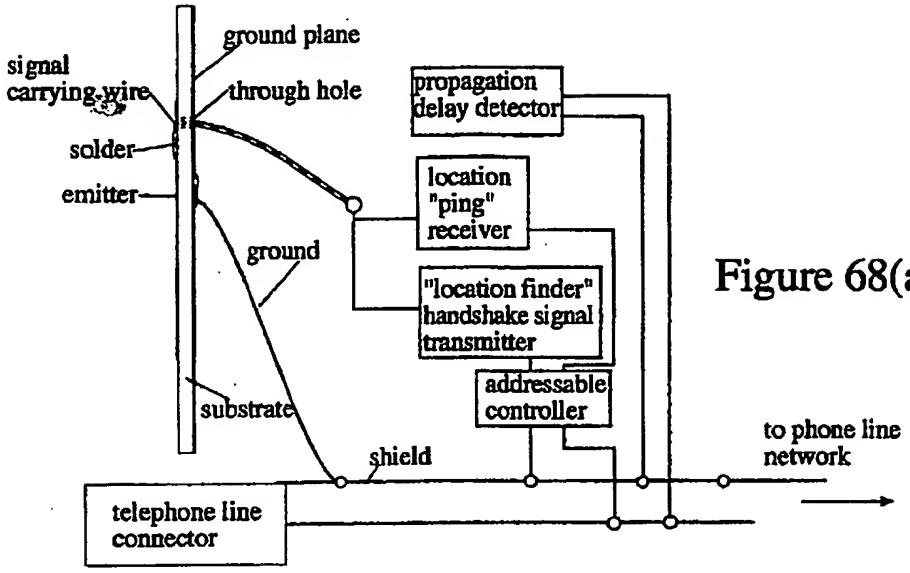
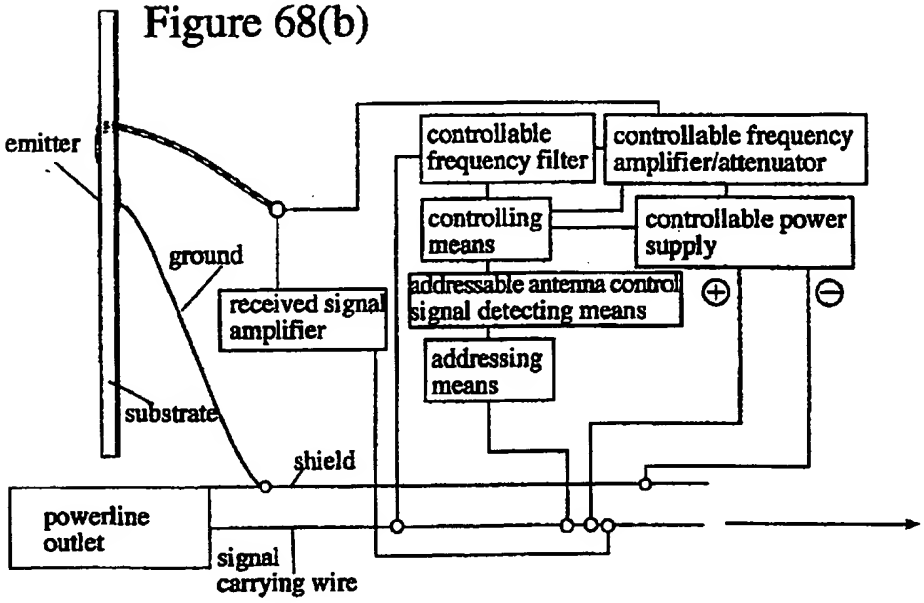


Figure 68(a)

Figure 68(b)



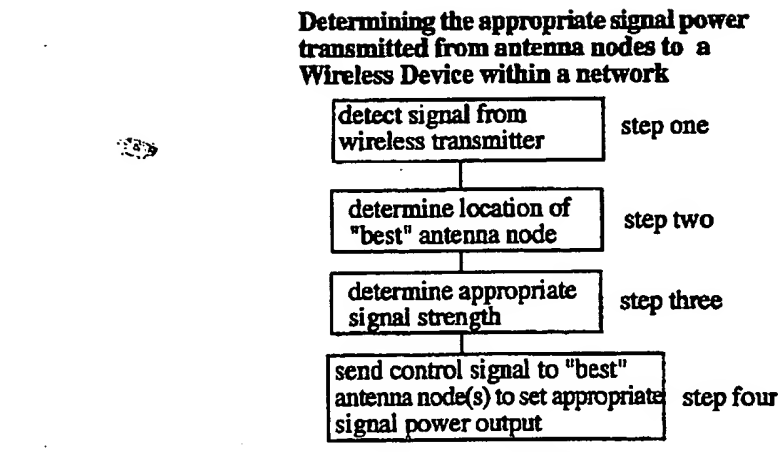


Figure 69(a)

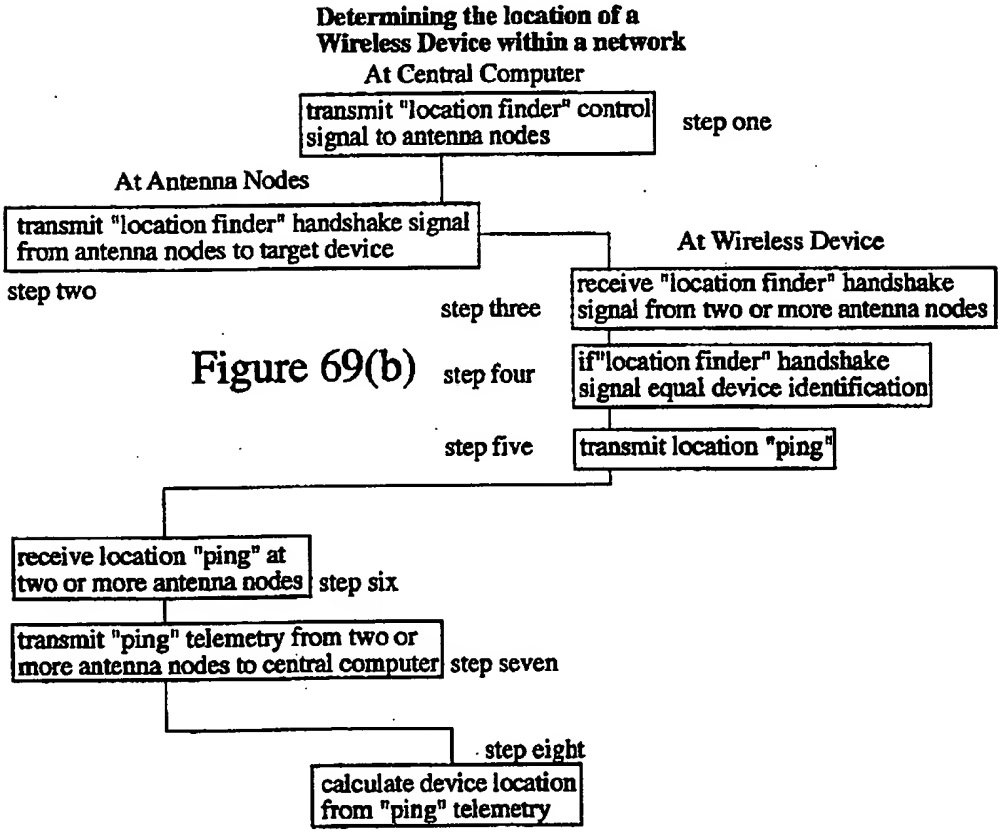


Figure 69(b)

Determining the appropriate signal power transmitted from antenna nodes to a Wireless Device within a network

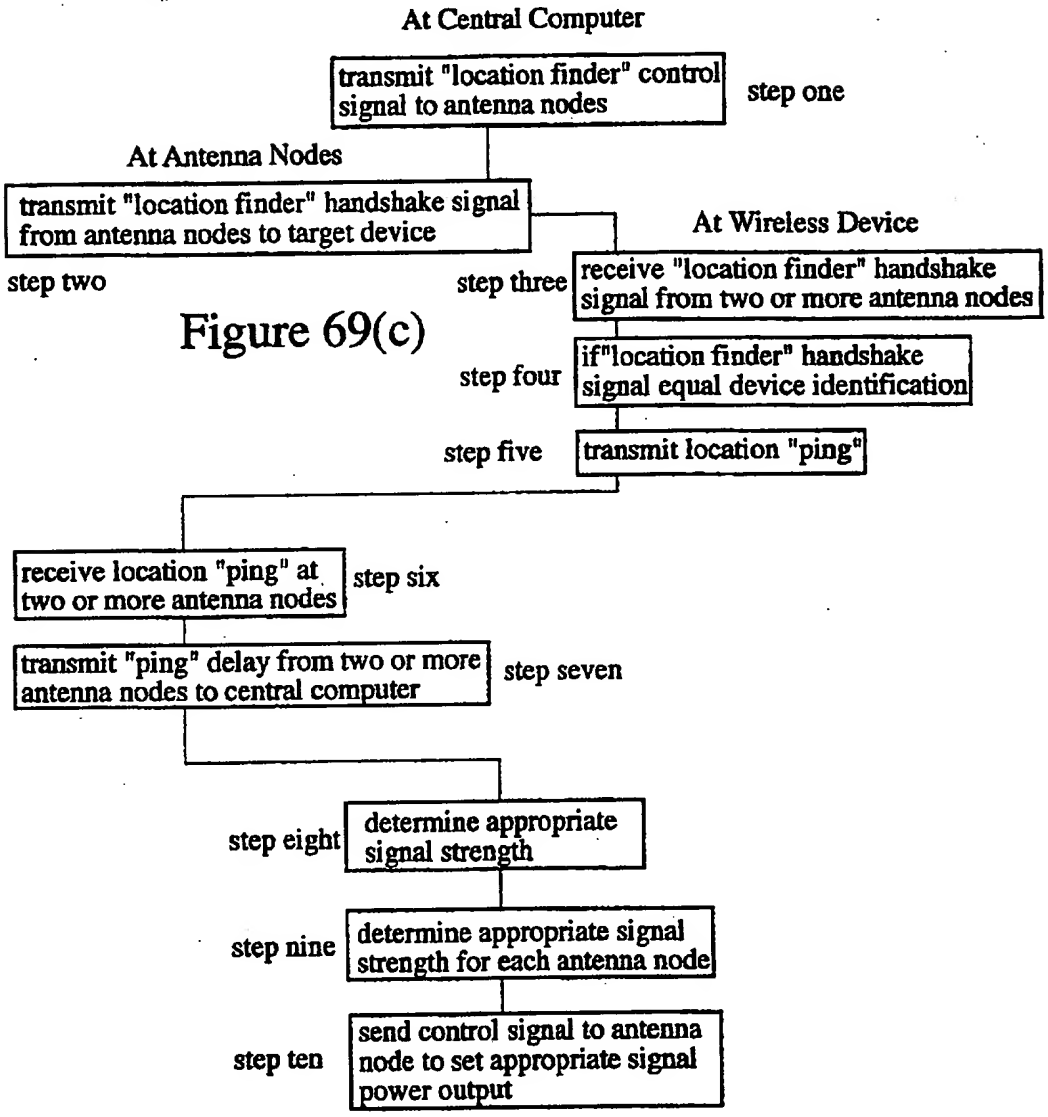
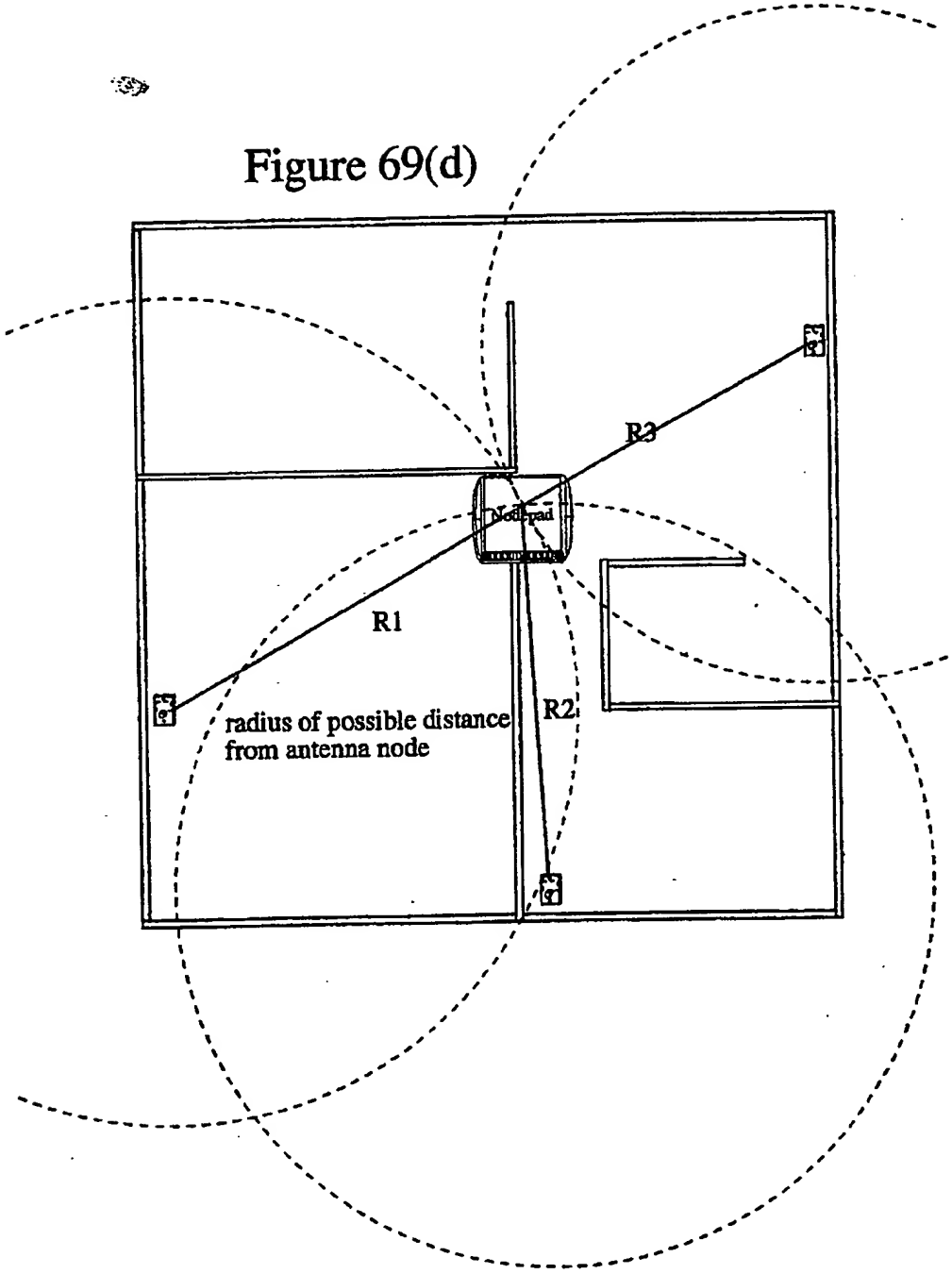


Figure 69(c)

Figure 69(d)



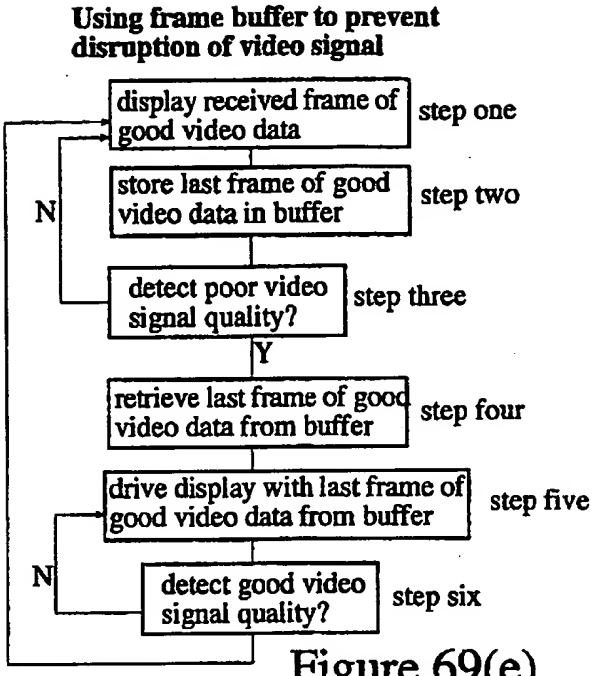


Figure 69(e)

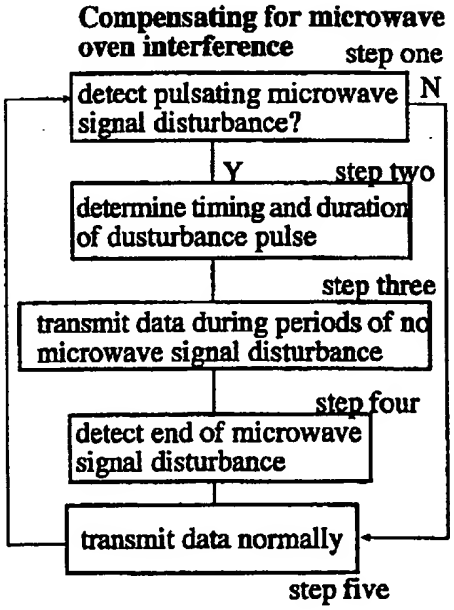


Figure 69(f)

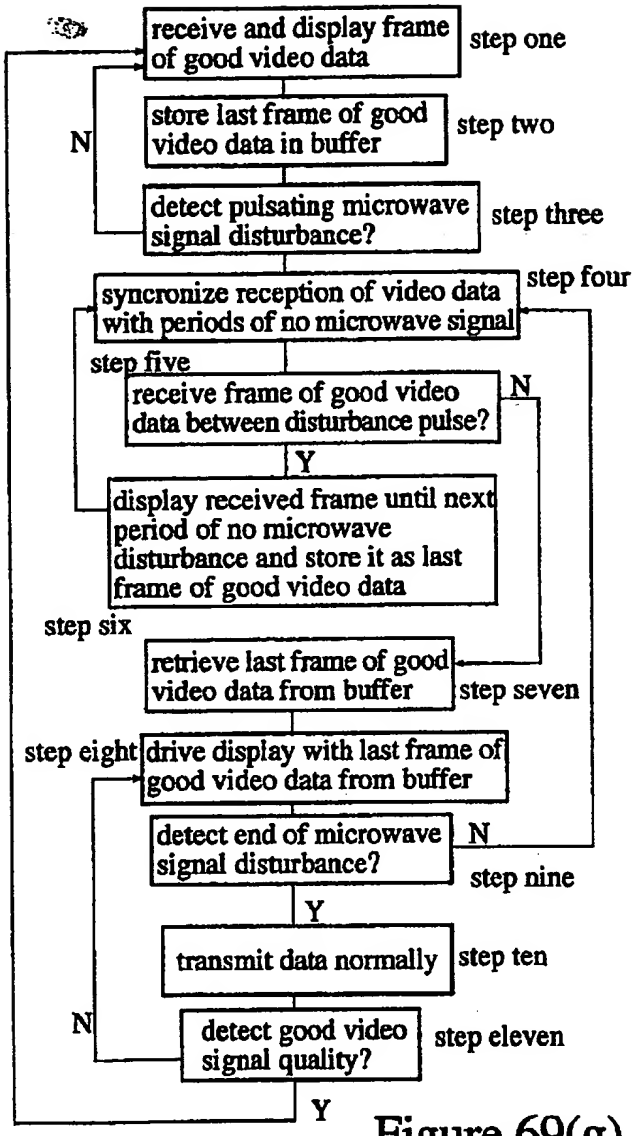
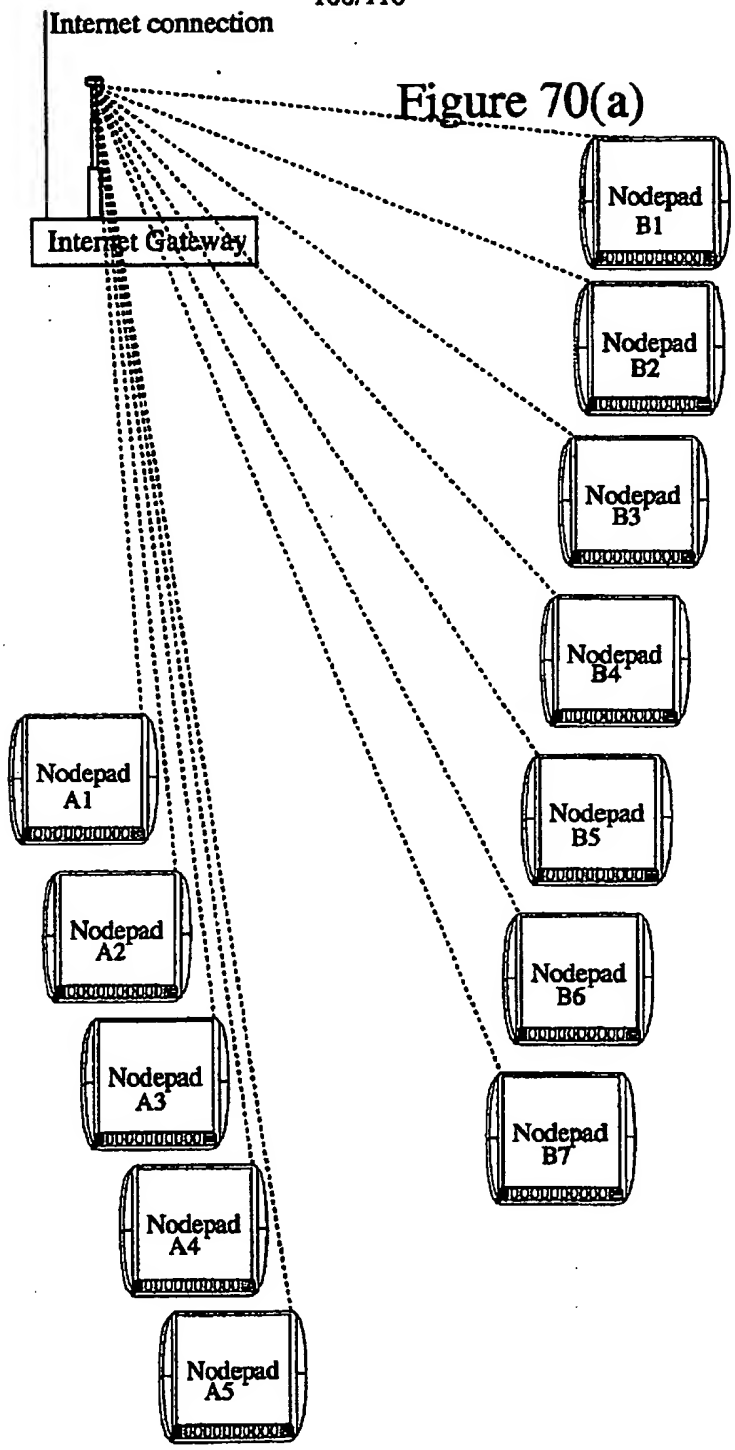

receive and display frame of good video data
step one
store last frame of good video data in buffer
step two
N
detect pulsating microwave signal disturbance?
step three
syncronize reception of video data with periods of no microwave signal
step four
step five
receive frame of good video data between disturbance pulse?
N
Y
display received frame until next period of no microwave disturbance and store it as last frame of good video data
step six
retrieve last frame of good video data from buffer
step seven
step eight
drive display with last frame of good video data from buffer
detect end of microwave signal disturbance?
N
step nine
Y
transmit data normally
step ten
N
detect good video signal quality?
step eleven
Y

Figure 69(g)

Figure 70(a)


Internet connection
Internet Gateway
Nodepad B1
Nodepad B2
Nodepad B3
Nodepad B4
Nodepad B5
Nodepad B6
Nodepad B7
Nodepad A1
Nodepad A2
Nodepad A3
Nodepad A4
Nodepad A5

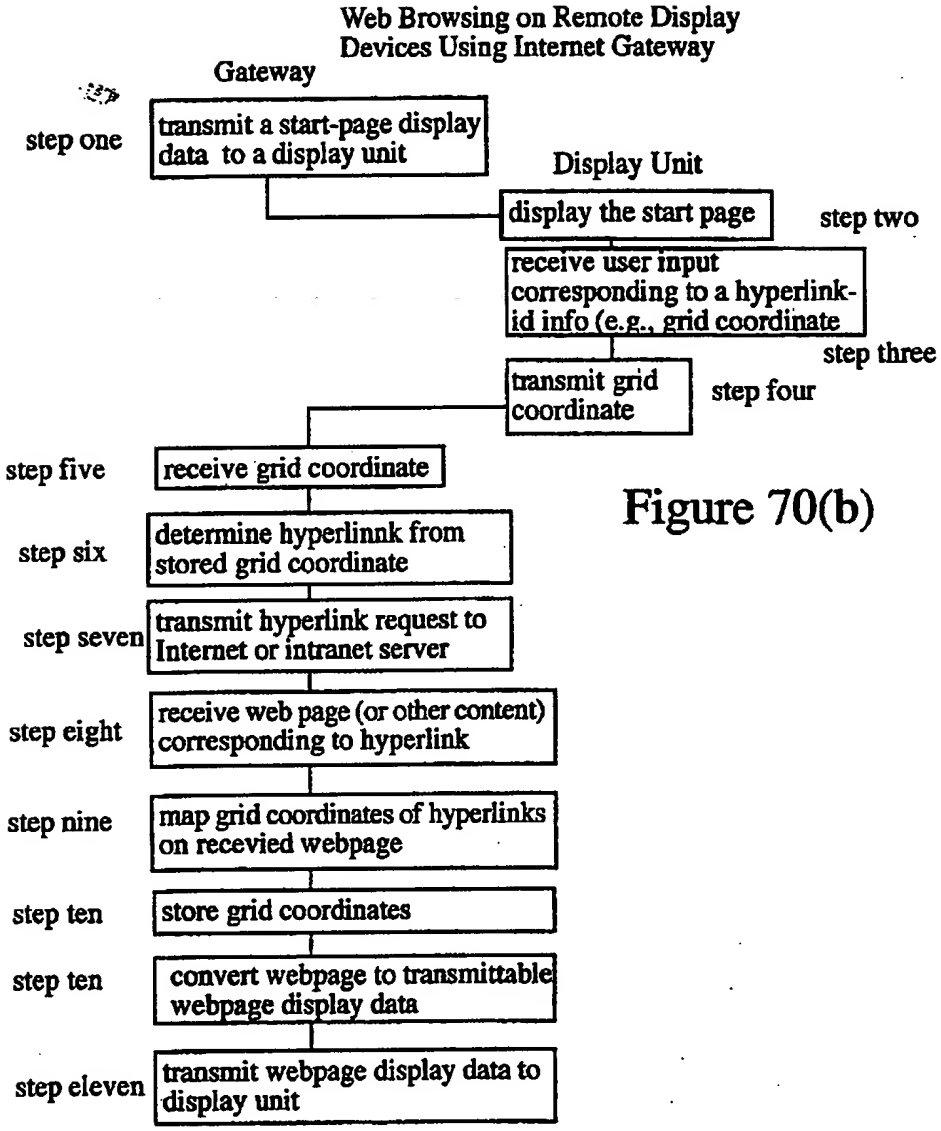

Web Browsing on Remote Display Devices Using Internet Gateway
Gateway
step one
transmit a start-page display data to a display unit
Display Unit
display the start page
step two
receive user input corresponding to a hyperlink-id info (e.g., grid coordinate
step three
transmit grid coordinate
step four
step five
receive grid coordinate
step six
determine hyperlinnk from stored grid coordinate
step seven
transmit hyperlink request to Internet or intranet server
step eight
receive web page (or other content) corresponding to hyperlink
step nine
map grid coordinates of hyperlinks on recevied webpage
step ten
store grid coordinates
step ten
convert webpage to transmittable webpage display data
step eleven
transmit webpage display data to display unit

Figure 70(b)

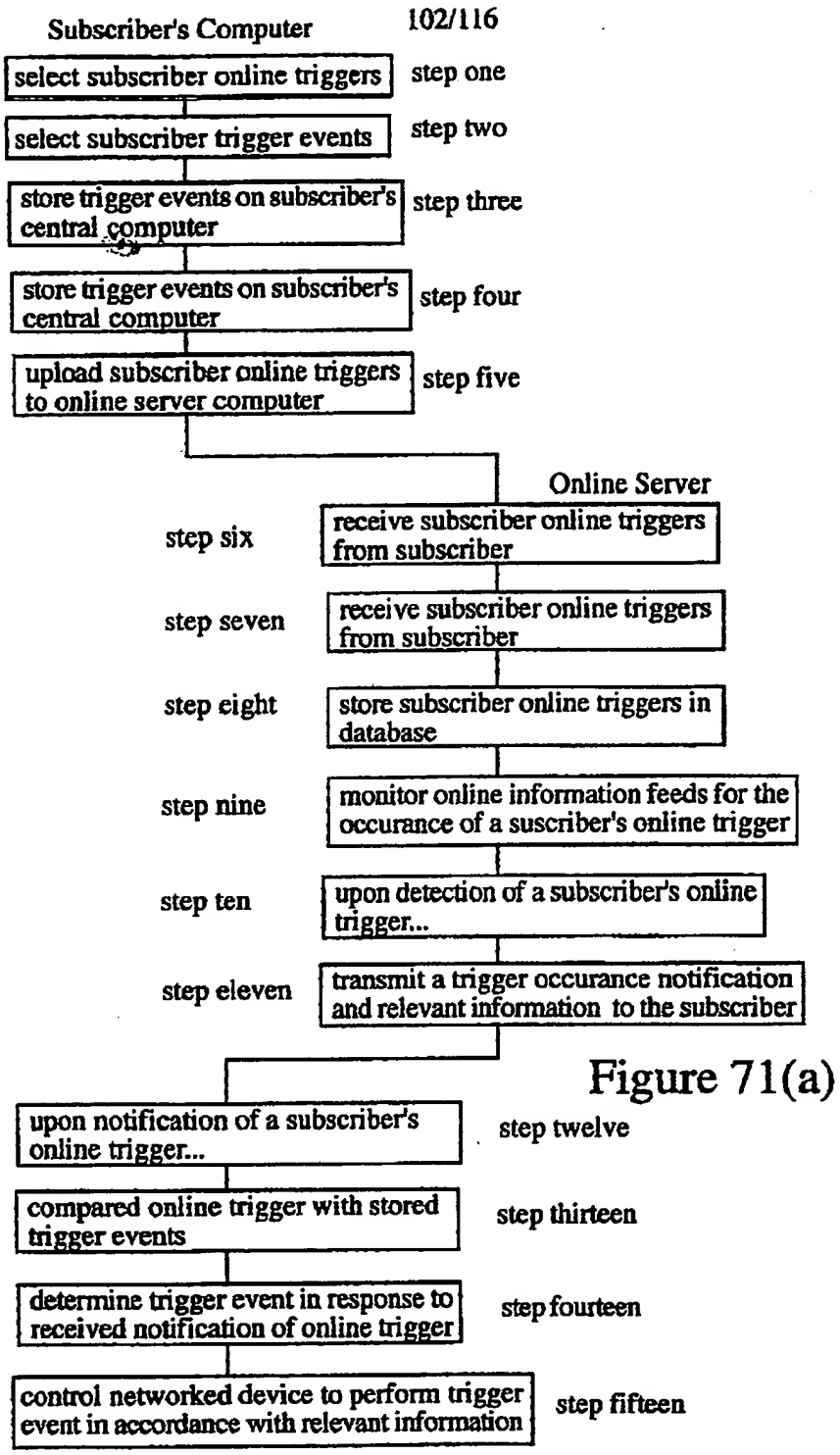

Subscriber's Computer
select subscriber online triggers
step one
select subscriber trigger events
step two
store trigger events on subscriber's central computer
step three
store trigger events on subscriber's central computer
step four
upload subscriber online triggers to online server computer
step five
Online Server
step six
receive subscriber online triggers from subscriber
step seven
receive subscriber online triggers from subscriber
step eight
store subscriber online triggers in database
step nine
monitor online information feeds for the occurance of a suscriber's online trigger
step ten
upon detection of a subscriber's online trigger...
step eleven
transmit a trigger occurance notification and relevant information to the subscriber
upon notification of a subscriber's online trigger...
step twelve
compared online trigger with stored trigger events
step thirteen
determine trigger event in response to received notification of online trigger
step fourteen
control networked device to perform trigger event in accordance with relevant information
step fifteen

Figure 71(a)

select subscriber online triggers

Trigger No:	Trigger Type:	Trigger:	Notification Method:	Online Info. Source:	Recurrance:
1	stock price	Apple Computer at 50	Instant message-type notification	NASDAQ online stock ticker	once, then ask for new price
2	television program	show with John Wayne	email-type notification	Online program guide	month, then check to confirm
3	email	email from partner	Instant message-type notification	subscriber's ISP mail server	always, until reset
4	Internet phone call	phone call from mom	Instant message-type notification	subscriber's Internet phone service	always, until reset
5	weather alert	severe weather immenent in Seymour CT	Instant message-type notification	NOAH online weather service	always

Figure 71(b)

select subscriber trigger events

Trigger No:	Trigger:	Trigger Event
1	Apple Computer at 50	open browser to Yahoo.com; do online news search with keywords ("Apple Computer", stock, price, "earnings report") occuring within one day; open second browser to Etrade.com; put local computer cahnnel in PIP on televsion in home office; send page to pager with message "Apple at 50";
2	show with John Wayne	get channel, time, duration and date information from email notification; control VCR in bedroom to record show; put show reminder in daily schedule for day show airs and day after recording;
3	email from partner	search email for priority; if priority equals "highest" put email in PIP on all display devices; ring phone with "urgent email" ring; if priority equals "lowest" leave email on ISP mail server
4	phone call from mom	put caller-id notification in PIP on all displays that are on; if called not answered by third ring, roll to cell phone; if call not answer by third cell phone ring, perform answering machine function and record message, send page with message "mom called" + date
5	severe weather immenent in Seymour CT	turn all displays on; turn volume on all display to 3/4; open web page NOAH.com/newhaven.ct/; open computer TV application; tune computer TV tuner to weather channel; compose weather channel and browser to split screen; switch all displays to local television program

Figure 71(c)

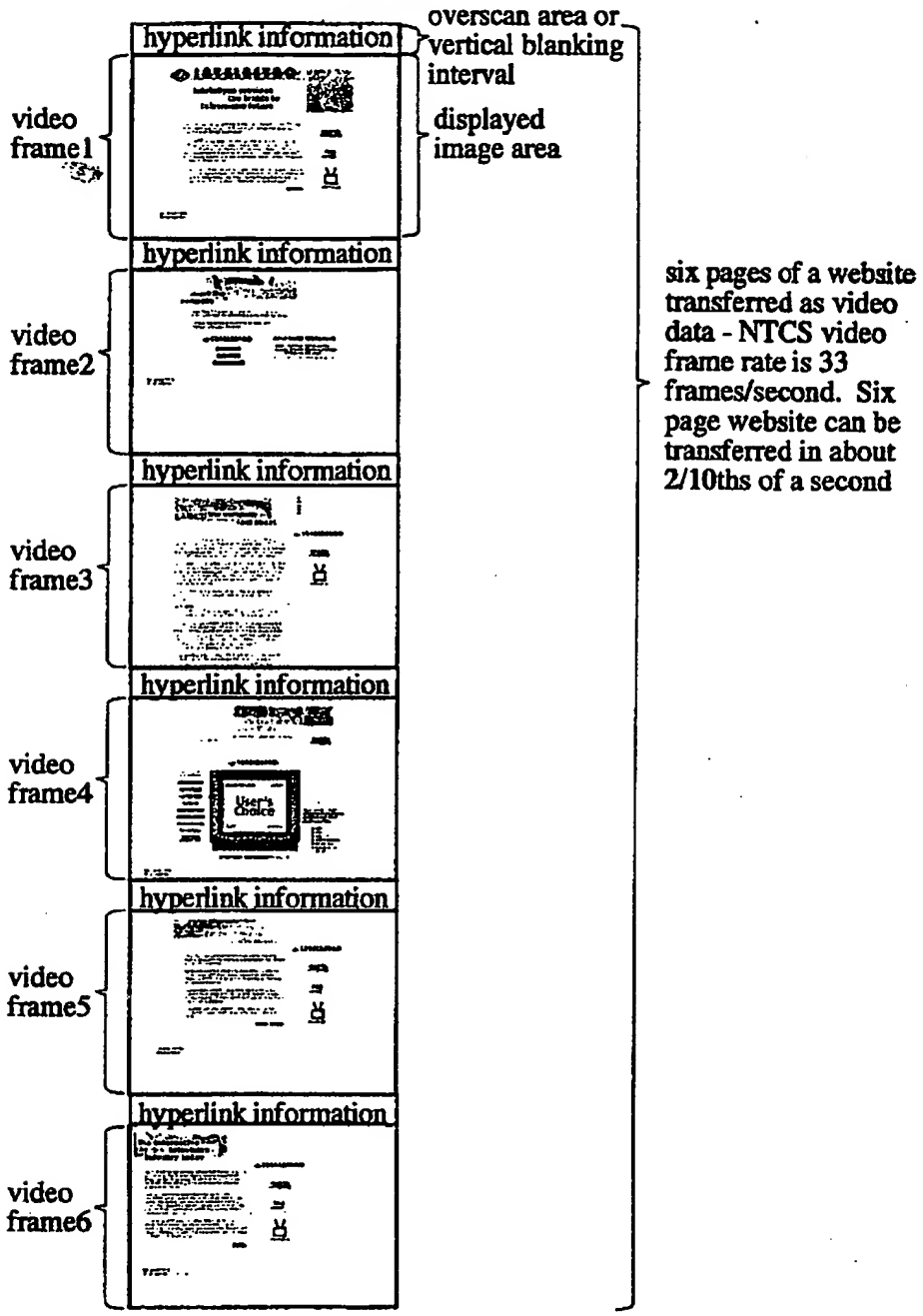


Figure 72(a)

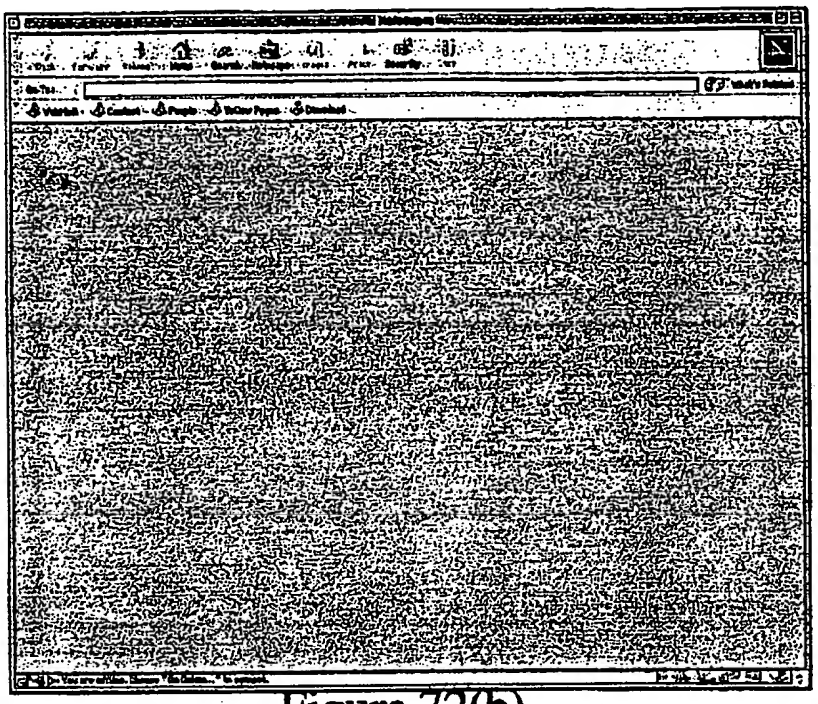


Figure 72(b)

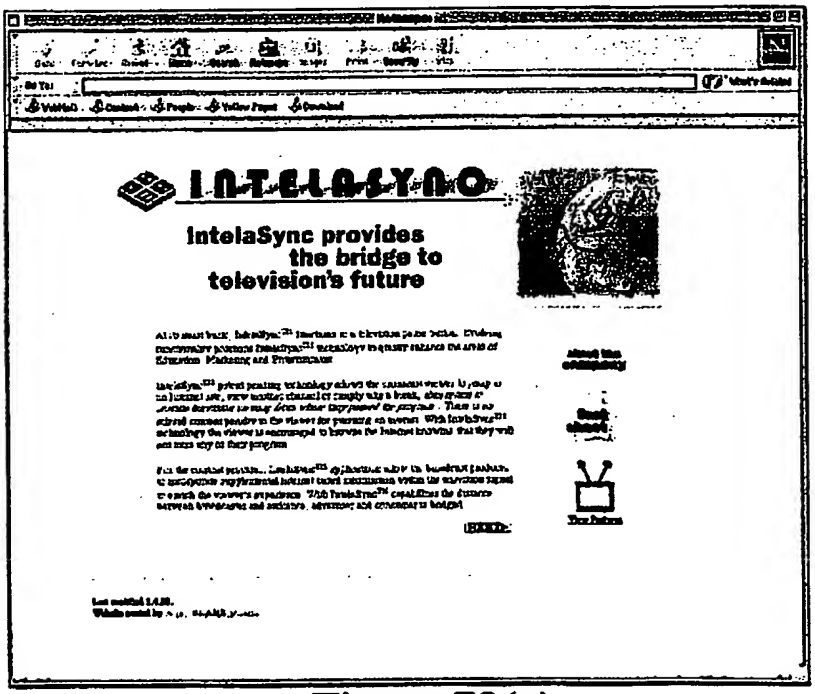


Figure 72(c)

Page Data:		
Page Title:	page location: videoA1 frame1	

Link Data:			
Link Title:	image location:	linked to:	operation:
about them company	486,324;509,356	videoA1 frame2	goto linked page
fact sheet	398,376;550,431	videoA1 frame3	goto linked page
view features	498,444;547,521	videoA1 frame4	goto linked page
next	385,513;436,526	videoA1 frame5	goto linked page
pointblank design	169,603;276,619	nycs8@aol.com	open new email; connect to WWW

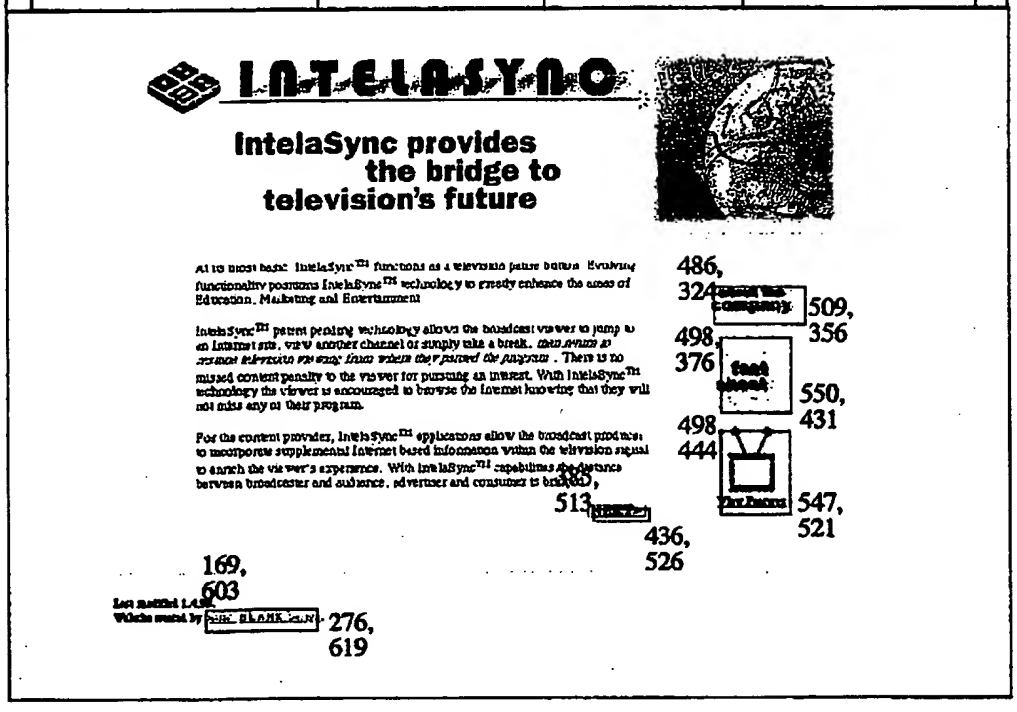


Figure 72(d)

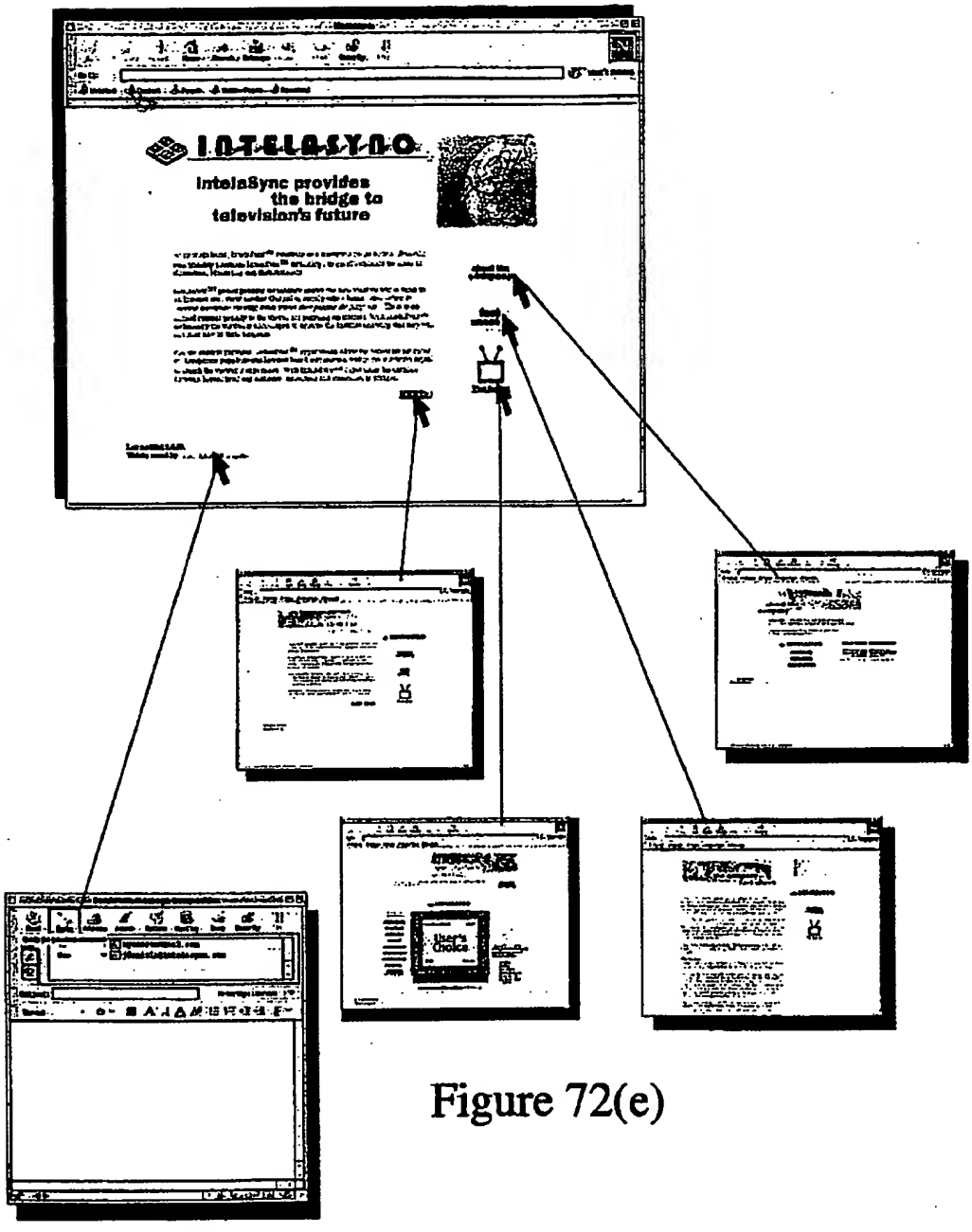


Figure 72(e)

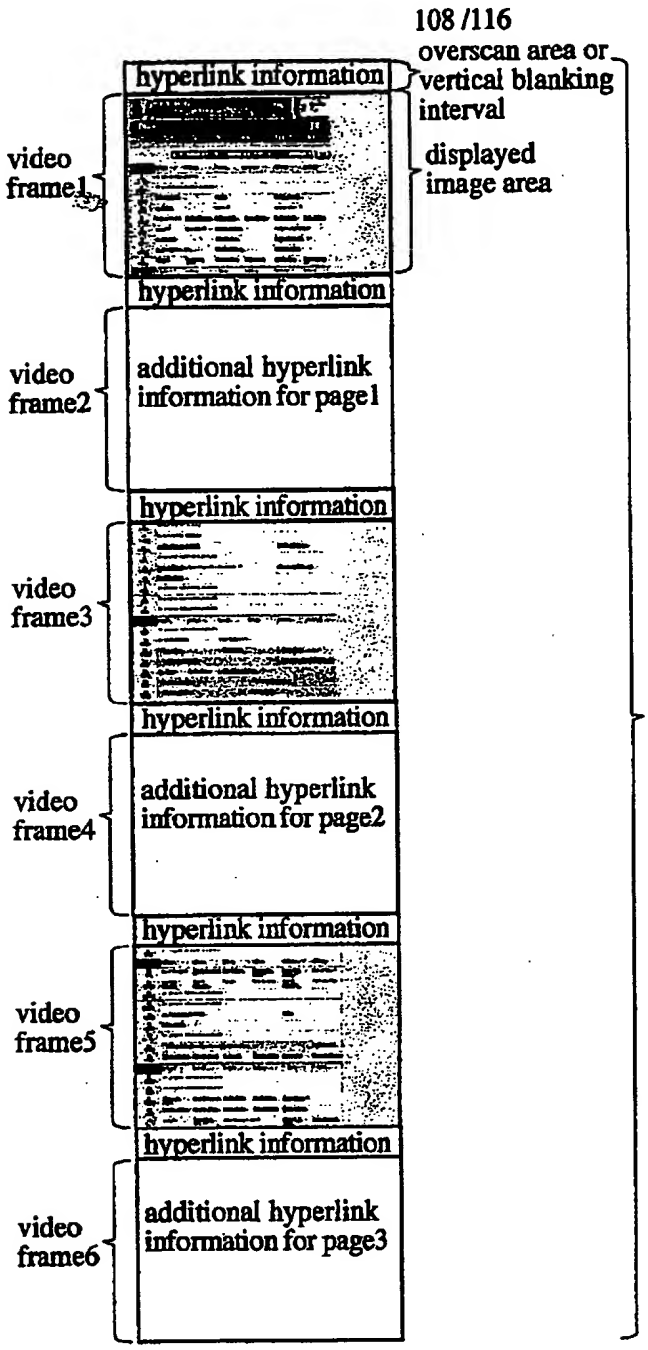

108 /116
overscan area or vertical blanking interval
displayed image area
hyperlink information
video frame1
hyperlink information
video frame2
additional hyperlink information for page1
hyperlink information
video frame3
hyperlink information
video frame4
additional hyperlink information for page2
hyperlink information
video frame5
hyperlink information
video frame6
additional hyperlink information for page3

Figure 72(f)

Page Data:			
Page Title:	page location:		pagereception:
entrypage	videoA1 frame1		213250701151999
Link Data:			
Page Element Title:	image location:	Element Order:	Element Type:
IntelaSync Logo	78,123;121,186	1	graphic
IntelaSync Text	150,32;121,186	2	graphic
Globe Graphic	512,137;662,271	3	graphic
Page Description	150,195;437,262	4	text
Company Description	118,301;513,504	5	text
Webmaster	86,597;172,612	6	text
Link Data:			
Link Title:	image location:	linked to:	operation:
about them company	486,324;509,356	videoA1 frame2	goto linked page
fact sheet	398,376;550,431	videoA1 frame3	goto linked page
view features	498,444;547,521	videoA1 frame4	goto linked page
next	385,513;436,526	videoA1 frame5	goto linked page
about the company	169,603;276,619	nycs8@aol.com	open new email; connect to WWW

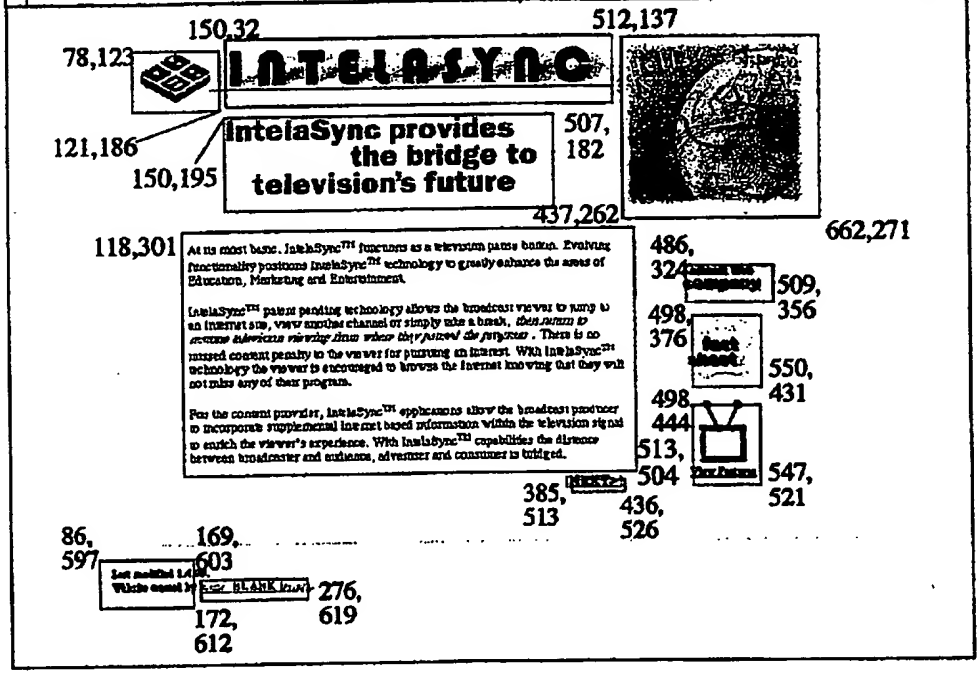


Figure 72(g)

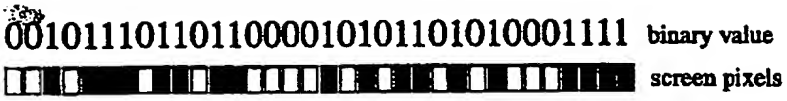


illustration of sending binary video data stream - using just the on-off state of the individual pixels

Figure 72(h)

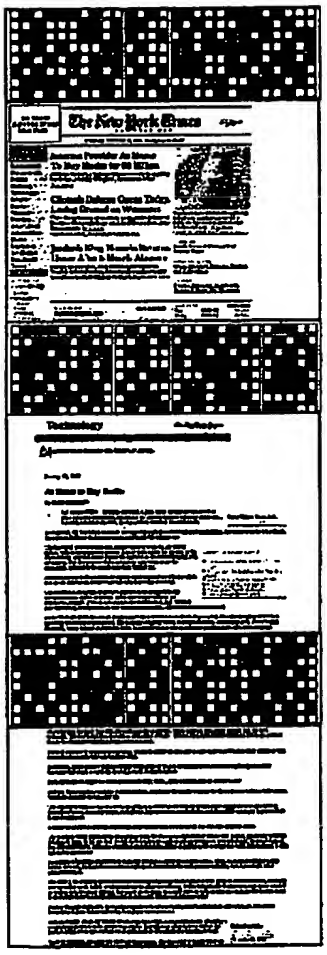
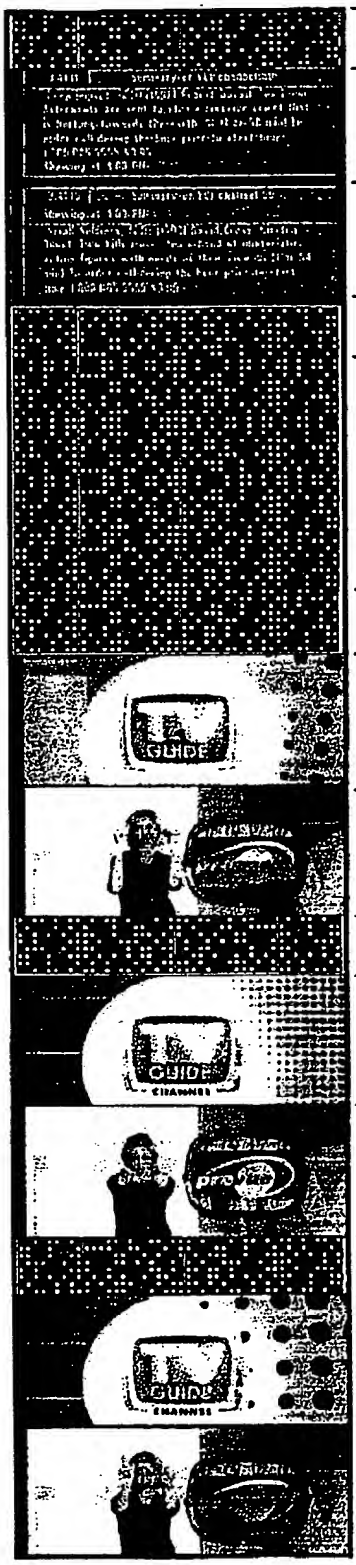


Figure 72(i)



hyperlink,page info and other non-videographic page info

split static videographic page information

split static videographic page information

videoframe 1

hyperlink,page info and other non-videographic page info contained withing the non-video display area

hyperlink,page info and other non-videographic page info contained within the video display area

hyperlink,page info and other non-videographic page info contained withing the non-video display area

videoframe 2

split moving image videographic page information

split moving image videographic page information

videoframe 3

hyperlink,page info and other non-videographic page info contained withing the non-video display area

split moving image videographic page information

split moving image videographic page information

videoframe 4

hyperlink,page info and other non-videographic page info contained withing the non-video display area

split moving image videographic page information

videoframe 5

split moving image videographic page information

Figure 72(j)

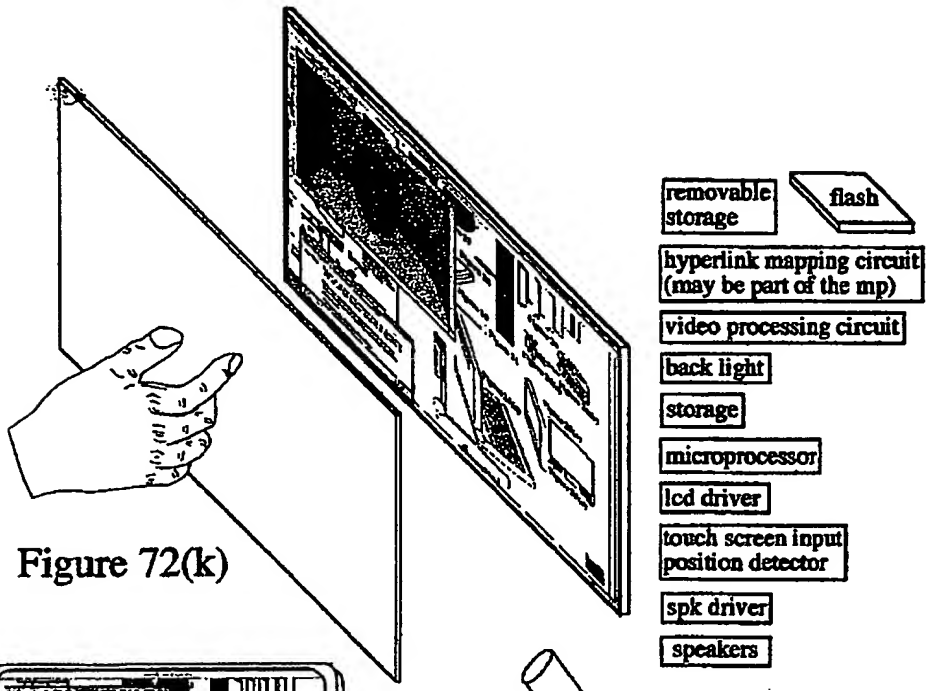


Figure 72(k)

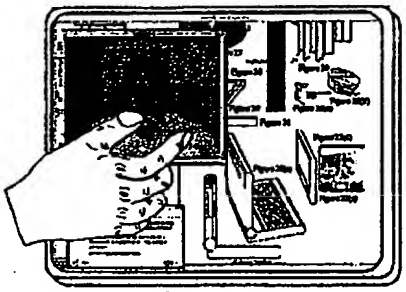


Figure 72(l)

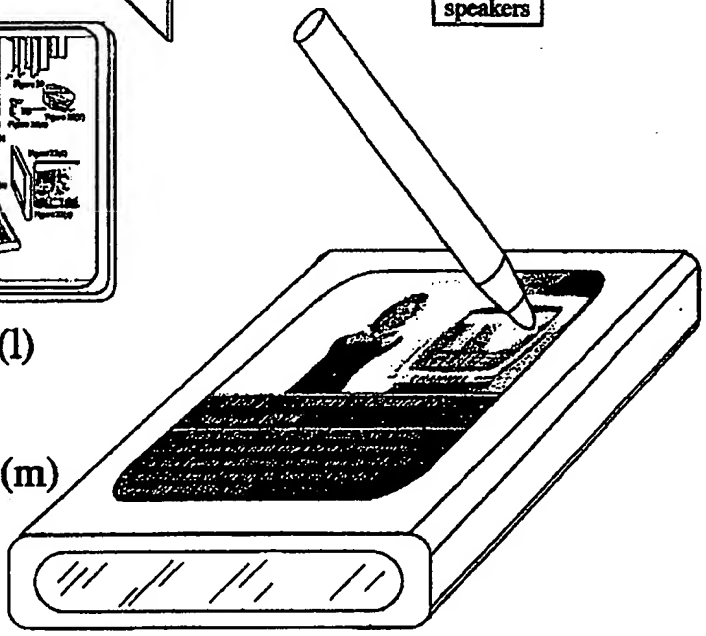


Figure 72(m)

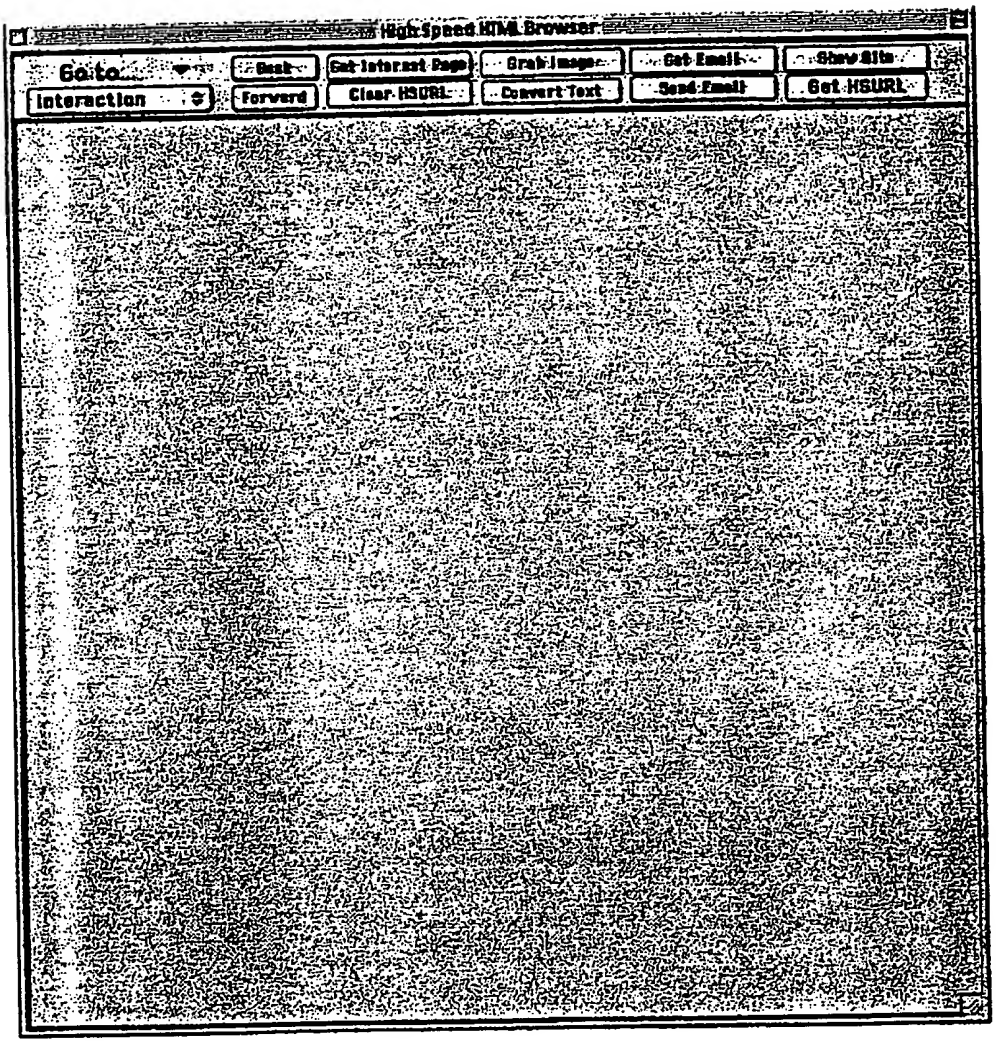

High-Speed HTML Browser
Go to...
Interaction
Back
Forward
Get Internet Page
Clear HSURL
Grab Image
Convert Text
Get Email
Send Email
Show Site
Get HSURL

Figure 72(n)

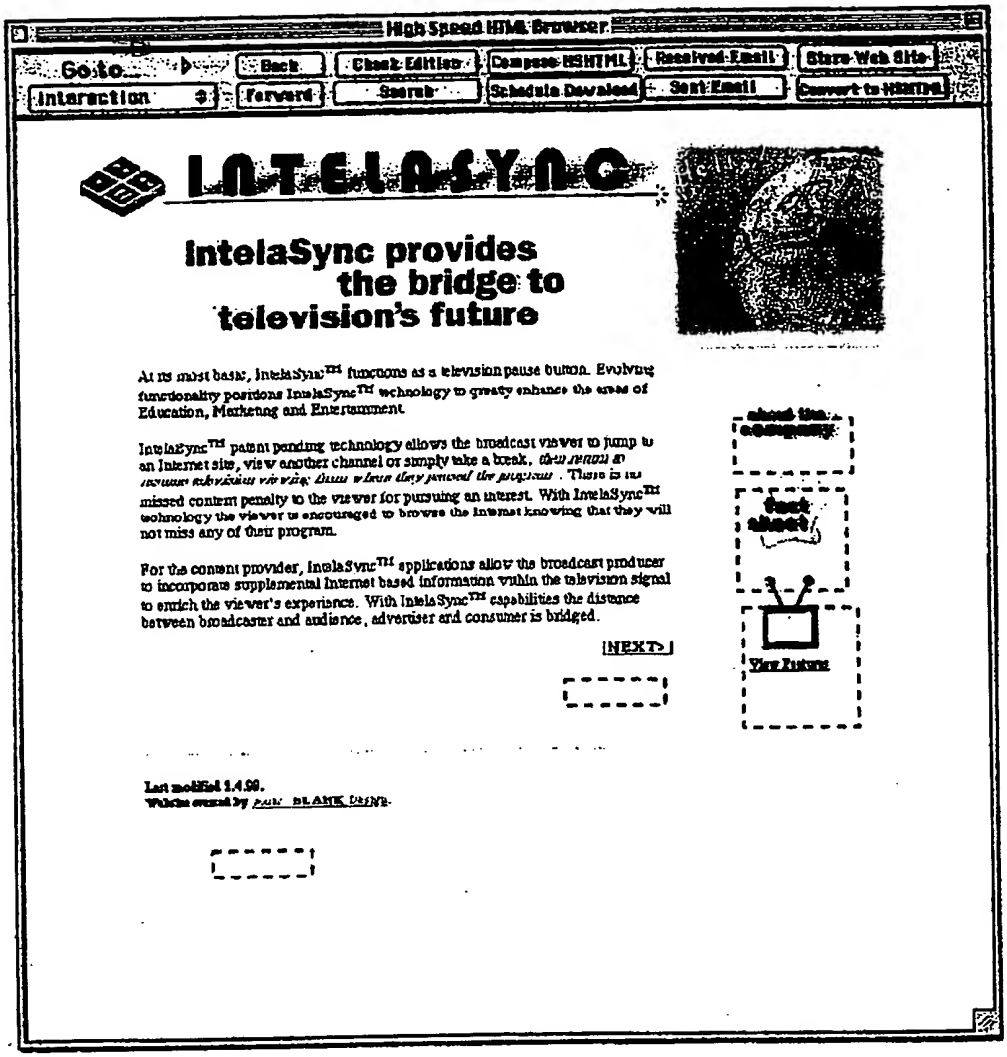


Figure 72(o)

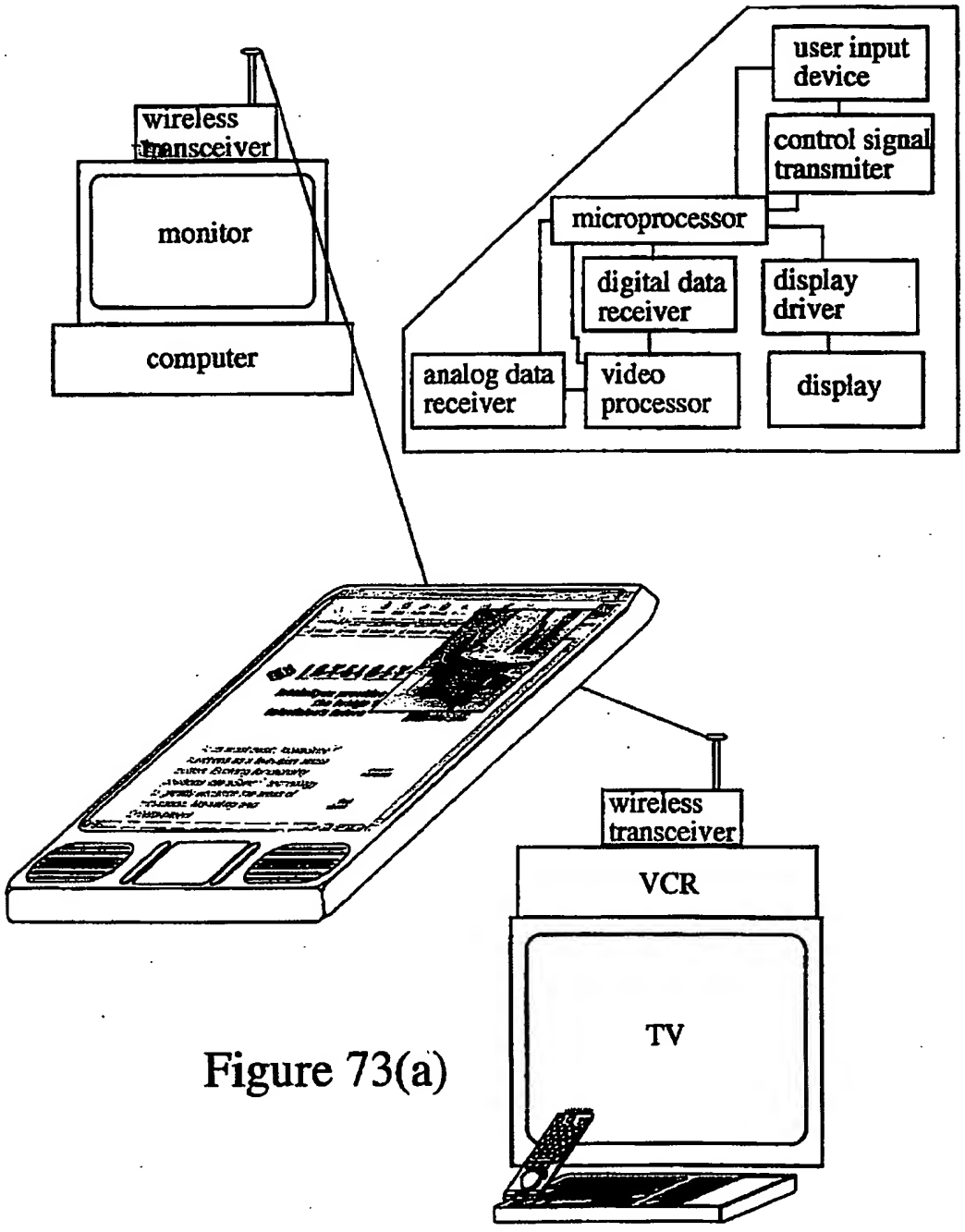

wireless transceiver
monitor
computer
user input device
control signal transmiter
microprocessor
digital data receiver
display driver
analog data receiver
video processor
display
wireless transceiver
VCR
TV

Figure 73(a)

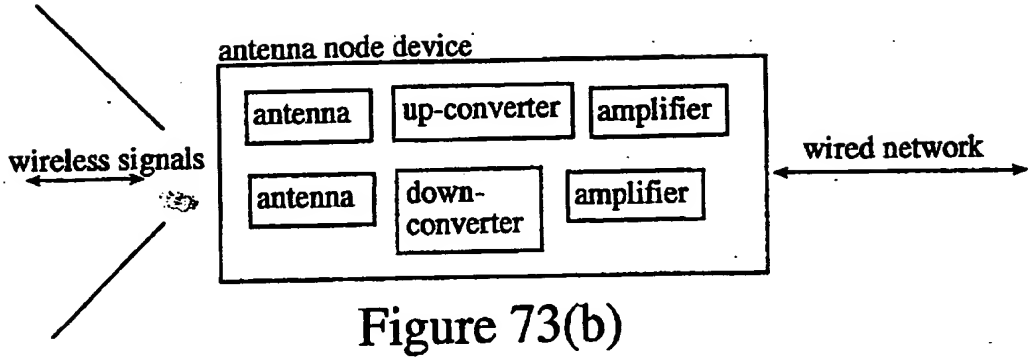


Figure 73(b)

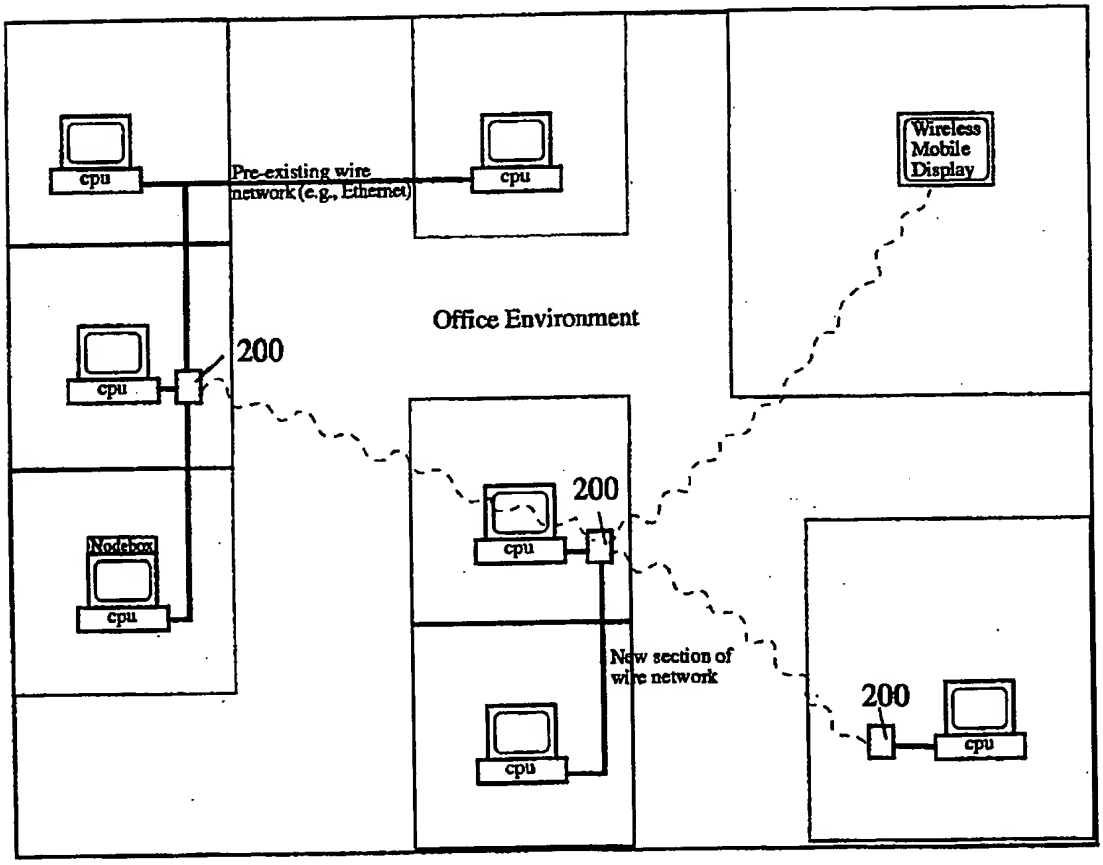


Figure 73(c)